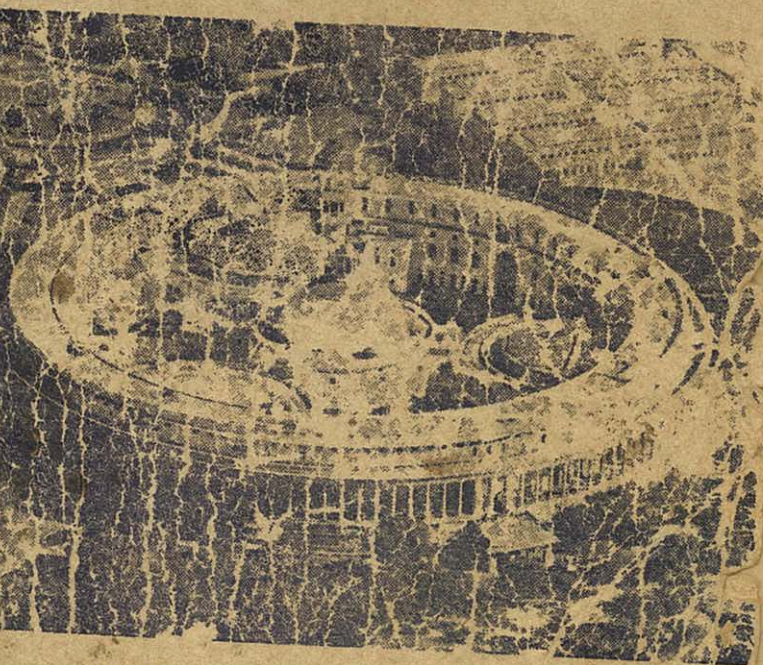


HAND-BOOK
of
TOWN-PLANNING



PARLIAMENT HOUSE, NEW DELHI

Price Rs. 500

By
V. K. BHIDASGAONKAR

HANDBOOK
OF *INS/2688*
TOWN-PLANNING



By
V. K. BHEDASGAONKAR

B. E. (Civil) A. M. I. E. (India)

M. R. San. I. (London)

Engineer Nagpur Improvement Trust (Retired)

& Part time Lecturer in

Town-Plannig, Nagpur University.

Inst 5778

2688 1958

2904

Price Rs. 5-0-0

Author and Publisher:
V. K. Bhedasgaoukar,
Kala-Kunj, Tilak-Nagar
Amraoti Road,
NAGPUR.

FIRST EDITION:—1954
SECOND EDITION:—1958
(Revised, enlarged & illustrated)
(All rights reserved with the Author)

Printer:
Amar Mudranalaya
Pothigali, New Itwari Road
NAGPUR-2.

FOREWORD.

(To 2nd Edition)

The Author has brought out the 2nd edition of his book on Town-Planning. This edition is revised and considerably enlarged in matter, with additions of Illustrative sketches. This has increased its utility, as a text-book and also as a reference book. The subject of Town Planning has been now receiving greater attention in India as a natural consequence of the large scale Development activities that are now going on, in various parts of India. The Urban population is increasing rapidly and new Industries are going fast, both in the Public and Private sectors. Transport, Communications and Educational facilities are also increasing in magnitude. All these factors, necessitate development of new colonies and new townships and improvement of existing ones. So it is but essential that both the Administrative staff and the general Public should have a working knowledge of the subject of Town Planning and its practical application. Also it is with the co-operation of the enlightened Public that the implementation of the town Improvement schemes becomes easier. For instance, existing slums can be cleared or improved, new slums can be prevented and health:

ful sorroundings and Amenities can be provided, only when there is co-operation from the Public.

The author Shree Bhedasgaonkar has brought to bear, his prrctical experience as an Engineer in the Nagpur Improvement Trust and his association with the work of preparation of the Master Plan of Nagpur, in producing this useful book. He has taken great pains in elucidating the contents of this book, which I hope would serve the useful purpose, it is meant for.

NAGPUR,
30-11-1958.

Y. K. Ghanekar,
Trust Engineer,
Nagpur Improvement Trust.

PREFACE

(to second edition)

It is a great pleasure to me to publish the second edition of the Book, within 4 years after its first publication. This is gratifying evidence of the appreciation, which the first edition of the book received at the hands of students and others, even though, the book was without any illustrative sketches and plans. In fact, in the preface to the first edition, I had apologetically made a reference to this deficiency in the book and had even assured the readers that it would be made good in the second edition. It is therefore a matter of great satisfaction to me that the commitment has been fulfilled to day, if not earlier.

The second edition has 15 chapters and about 250 pages as against 10 Chapters and 105 pages, in the first edition. The noticeable features of this edition lie in (1) Publication of 38 Illustrative plans and sketches with foot notes given below each figure, (2) Addition of altogether new material under the new chapters on, Town planning in India, Land Sub-division, Town and Neighbour-hood Centre and Civic design. (3) more exhaustive treatment of each subject and (4) Re-arrangement of the whole matter, under the most appropriate heads or chapters. For instance, the subject of planning of shopping-cum-Business centre, which had been completely omitted before, has now been included, along with 'Industries' is one and the same chapter, where both the subjects are dealt with, in an exhaustive manner; Also the subjects of Public and Semi-public buildings originally

grouped with Industries, now goes with Town and Neighbourhood Centres. Similarly the chapter on 'Master Plan' has been considerably enlarged and the subject is dealt with in greater details than before. Also the Master Plans of two typical Towns, viz, New Crawley Town and Chandigarh, the new Capital of Punjab have been given at the end of the chapter as illustrative examples of the practical application of some of the Town Planning principles.

It is hoped that this illustrated and enlarged edition, would meet almost all requirements of the readers in general and students in particular and serve them as a valuable guide for the study and proper understanding of the subject. To cover up the additional cost on printing and block making, a little increase (only a rupee) in the price of this edition was inevitable and I hope that the readers would not grudge the same.

The Book (1st Edition) is already in the list of approved Reference books for students studying for M. A. Degree (with Public Administration) and L. S. G. D. Diploma Courses of the Nagpur University and I take this opportunity to thank the Nagpur University for the same.

I am very grateful to the Authorities of the Nagpur Improvement Trust for kindly permitting me to publish the plans of their lay-out of Ambazari Basti Precinct and Low-income Housing Precinct (Shankar-Nagar) in the Civil Expansion Scheme, at Nagpur.

I am indebted to the various authors, writers and Government Publications referred to, in the Bibliography, attached to this edition, for such of the material, plans and sketches, as have been incorporated in this

Edition. I must make a special mention of the Journal of the Royal Sanitary Institute London (now the Royal Society of Health) as a lot of material (inclusive of plans and sketches) for this book has been drawn from the illuminating Articles contributed to this journal by eminent writers and Authorities on the subject. I take this opportunity to thank all of them collectively as their large number would make their individual mention well-nigh impossible.

Before I take leave, I consider it my duty, to thank my readers in general and students in particular, but for whose patronage, this edition could not have seen the light of the day, so soon.

21-10-58
Vijya-Dashami
Nagpur.

V. K. Bhedasaonkar,

FOREWORD

(to first edition)

The need for a book like this, was felt by me about a dozen years ago when I was called upon to organize the teaching for Diploma course in Local Self Government at the University of Allahabad. Town-planning formed a part of the Syllabus. There was no lack of literature on the subject, but there was hardly a book, which could be placed in the hands of the students, with assurance of their being able to follow it intelligently. They all related to a background alien and unfamiliar to our students. When the University of Nagpur, therefore, organized a similar course some four years ago and appointed my friend and colleague Shree V. K. Bhedasgaonkar, as lecturer in the subject of town planning. I suggested to him that he should write a short book on the subject, which would have the Indian background and might be handy for the students. I am happy to find the suggestion has borne fruit, and it is with great pleasure that I contribute this foreword to the book.

Shree Bhedasgaonkar, as a member of the Engineering and Town-planning staff of the Nagpur Improvement Trust, and as one who has had long to do with town planning, including the preparation of the Master Plan of the Greater Nagpur, has brought both technical competence and practical experience, to bear upon his task and has produced a book, which I think will be of interest not only to the students of the subject but also to the members of his own profession and the general public interested in town planning.

Witin a short compass of about 110 pages, the author has covered a wide field, surveying the underlying principles and objectives of town planning, the practical problems involved in the making and execution of a town plan, compulsory land acquisition and the determination of compensation in respect of it.

A glance through the list of the contents is sufficient to show the comrehensiveness of his treatment. Nothing of importance has been omitted. The book also makes an interesting reading.

✓ We live in the era of all-round planning. Town planning is perhaps the oldest branch of conscious planning for public purposes. It is also a species of planning which concerns our every day life and its comforts, and discomforts at more numerous points than perhaps any other. It therefore deserves to be studied and understood by as wide a circle of citizen as possible and I am sure the present book will serve as a valuable indroduction to such study and understanding ✓

M. P. Sharma

9-1-1954)

(Head of the Department of Public

Nagpur.)

Administration and local

Self-Government,

Nagpur University).

PREFACE

(to first edition)

The need of comprehensive planning or re-planning of our towns is becoming more and more urgent, day by day, with the increase in the number of problems, created by the phenomenal growth of our towns, in the past few decades. The importance of town-planning, is further emphasized, by the colossal cost, to the Local Authorities, to rectify the mistakes committed in the past. The importance of the subject is obvious to officers, connected with public administration in general and local bodies in particular, because the task of translating any plan into reality, ultimately devolves upon them. In fact, efficient administration is one of the basic assumptions of sound planning for even the best plan can be set at naught, by an inefficient administration and with it, lack of co-operation from the public. That is why there is so much need of trained personnel for the administrative services all over the country.

The Nagpur University deserves to be congratulated for the step, it has taken in this direction, in inaugurating in 1950, a new department of Public Administration and local Self Government and providing through it, two new courses one leading to a Diploma and the other to a post-graduate degree (viz. M. A. with Public Administration). The Syllabus drawn for the courses, included one paper on Town-planning, Municipal Administration and Public Health, all the three combined in one and the author on the recommendation of the then Chairman of Nagpur Improvement Trust, had the

(VII)

privilege of being appointed as the first part-time lecturer in Town planning, for both the classes. The Author takes this opportunity to express his deep sense of gratitude, to Rai Bahadur P. B. Das, the then Chairman of N. I. Trust for the same and also the Board of Trustees who kindly permitted him to accept this part-time job.

Soon after the assumption of his new responsibilities, the author found that for want of a suitable text-book, it was not an easy task to arrange for a satisfactory course of teaching, on such a vast subject, within only say about 30 lectures or periods, and that too, to a class of students without the back-ground of any technical training. The author therefore found it necessary to prepare his own notes after going through a number of authoritative works on the various phases of the subject and it was on these notes that he depended for his class room lectures and subsequently, for supplying the material for this book.

The need for a single book, which would serve the purpose of a text or reference book was still greater from the students' point of view as the volumes referred to above were either too advanced or too technical to serve any useful purpose, to ordinary students, who had neither the time nor the patience to go through them, particularly because of the comparatively smaller weightage given to the subject in the crowded University curriculum; so the students first looked round for a book, where they could find everything at one place but when they did not come across such a one, they naturally approached the author with a request to write such a book for them. The request was repeated almost every year and at last the author had to concede to it and even

(VIII)

promise, to place the book in their hands by the beginning of the current year (1954) but sufficiently before their ensuing University Examination: so there was no time to lose; the work of writing the manuscript, as well as its printing, went almost simultaneously and it is a great pleasure to the author to publish and place this in the hands of students to-day, if not either.

It would not be out of place to mention that the author had the unique privilege of being entrusted with the work of preparation of the master plan for Greater Nagpur, only last year and the practical experience gained by him, while he was on that job proved very valuable to him, in writing this book.

This book is, to a great extent, development of lecture notes prepared by the author for use in his classes at the university, which such additions and alterations as were found to be necessary for arranging the same, in a book-form for bringing it up-to-date and for covering the complete course including notes on Town Planning law and procedure and the relevant Acts.

In this book, the author has tried to bring, in a concise form, much of the material, already written on the subject, only adding the results of his own experience in his professional practice, hitherto. As such, he does not claim any originality of ideas.

Although the book is primarily intended to serve as a text or reference book for students of Engineering, Town Planning, in general and students of Public Administration and Local Self-Government, in particular, every attempt is made to enlarge its scope so that it may be of service even to Legislators, Corporators, Trustees,

(IX)

members of all Local Bodies, and all officers in the Administrative services, particularly in Municipalities, Corporations, Improvement Trusts and Development Boards as would be evident, even from a glance at its comprehensive contents.

This book is also meant to serve every citizen, who is interested in the improvement of his own village, town, or city and to create in him, a 'Civic Sense' and a spirit of local service and patriotism.

With those objects in view, the author has tried to stress, almost all the problems of town-planning with which, officers executing town-planning schemes, come across in actual practice even though, he had to go a little, beyond the limits of the University syllabus. Also the subject is presented in such a manner that it could be easily followed by any non-technical person or student. Further emphasis is laid on the fundamental principles of the planning technique, rather than obtruse details of practice, which is usually the job of professionals. Also every problem is approached, from a scientific out-look and attempt is made to go, at the root of every problem. Another point, which deserves special mention is that, in both the, out-look and the back-ground, the book is essentially *Indian*.

An outstanding feature of the book lies in the peculiar method or technique followed, in the arrangements of its contents, which has given the book a sort of 'Questions' and 'Answers' form viz. each para or sub-para connotes one question on an aspect, which is suggested in the title of the para or sub-para itself and it is answered, just below, in brief but choice expressions; as such, the book would have a special appeal for students, who may look at it from an examination point of view.

(X)

Originally the author had an idea of publishing a number of illustrative sketches, plans etc., as annexures, for better understanding of the subject but he had to drop the idea, at the eleventh hour, for want of time, as he was anxious to keep to his commitments to the students,

The author is conscious of this deficiency in this book and he would assure the readers that he would make it good, in the 2nd edition, if an occasion for publishing such an edition would arise in the near future.

The author is grateful to Dr. M. P. Sharma, M. A. D. Litt. the Head of the department of the Public Administration and Local Self Government, Nagpur University, for encouraging him in this venture and for sparing his valuable time for writing 'Foreword' to this book.

He is also thankful to Shree N. P. Vyas, his colleague in the Nagpur Improvement Trust, for preparing the design for the block used on the front page, to which, the book owes its smart get-up.

The Author is equally indebted to the various authors and writers, referred to, in the 'Bibliography'.

Lastly, the Author has to thank the management of the Gorakshan Printing Press Nagpur, for the hearty co-operation and valuable assistance which he received from them at every stage, while the book was under print and for making every effort to complete the printing in time, to his entire satisfaction.

14-1-1954

Markar-Sankrant,
NAGPUR.

V. K. Bhedasgaonkar

BIBLIOGRAPHY

- (1) The Culture of cities
- (2) Town and country planning
- (3) Principles of City Planning
- (4) Design of Residential Areas
- (5) Town Planning & Road Traffic
- (6) A Handbook of Town Planning
- (7) Valuation of Real Property
- (8) Town Design
- (9) Modern Town and Country Planning
- (10) Town and Country Planning
- (11) Patrick Geddes in India
- (12) 80 Designs of Buildings for every purpose
- (13) Chandigarh
- (14) Report of Nagpur Improvement Trust Enquiry Committee

DEDICATED TO THE MEMORY

OF

MY LATE, LOVING MOTHER.

- (15) Town and Country Planning
- (16) Town and Country Planning
- (17) Town and Country Planning
- (18) Town and Country Planning
- (19) Town and Country Planning
- (20) Town and Country Planning
- (21) Town and Country Planning
- (22) Town and Country Planning
- (23) Town and Country Planning
- (24) Town and Country Planning
- (25) Town and Country Planning
- (26) Town and Country Planning
- (27) Town and Country Planning
- (28) Town and Country Planning
- (29) Town and Country Planning
- (30) Town and Country Planning
- (31) Town and Country Planning
- (32) Town and Country Planning
- (33) Town and Country Planning
- (34) Town and Country Planning
- (35) Town and Country Planning
- (36) Town and Country Planning
- (37) Town and Country Planning
- (38) Town and Country Planning
- (39) Town and Country Planning
- (40) Town and Country Planning
- (41) Town and Country Planning
- (42) Town and Country Planning
- (43) Town and Country Planning
- (44) Town and Country Planning
- (45) Town and Country Planning
- (46) Town and Country Planning
- (47) Town and Country Planning
- (48) Town and Country Planning
- (49) Town and Country Planning
- (50) Town and Country Planning
- (51) Town and Country Planning
- (52) Town and Country Planning
- (53) Town and Country Planning
- (54) Town and Country Planning
- (55) Town and Country Planning
- (56) Town and Country Planning
- (57) Town and Country Planning
- (58) Town and Country Planning
- (59) Town and Country Planning
- (60) Town and Country Planning
- (61) Town and Country Planning
- (62) Town and Country Planning
- (63) Town and Country Planning
- (64) Town and Country Planning
- (65) Town and Country Planning
- (66) Town and Country Planning
- (67) Town and Country Planning
- (68) Town and Country Planning
- (69) Town and Country Planning
- (70) Town and Country Planning
- (71) Town and Country Planning
- (72) Town and Country Planning
- (73) Town and Country Planning
- (74) Town and Country Planning
- (75) Town and Country Planning
- (76) Town and Country Planning
- (77) Town and Country Planning
- (78) Town and Country Planning
- (79) Town and Country Planning
- (80) Town and Country Planning
- (81) Town and Country Planning
- (82) Town and Country Planning
- (83) Town and Country Planning
- (84) Town and Country Planning
- (85) Town and Country Planning
- (86) Town and Country Planning
- (87) Town and Country Planning
- (88) Town and Country Planning
- (89) Town and Country Planning
- (90) Town and Country Planning
- (91) Town and Country Planning
- (92) Town and Country Planning
- (93) Town and Country Planning
- (94) Town and Country Planning
- (95) Town and Country Planning
- (96) Town and Country Planning
- (97) Town and Country Planning
- (98) Town and Country Planning
- (99) Town and Country Planning
- (100) Town and Country Planning

Note—The list obviously excludes Institutional Jour-
nals, periodicals, magazines, reports, Government publica-
tions, which are too numerous to be acknowledged
individually.

BIBLIOGRAPHY

- | | |
|---|--|
| (1) The Culture of cities | Lewis Mumford. |
| (2) Town and country
Planning | Patrick Abercrombie. |
| (3) Principles of City
Planning | Lohmann. |
| (4) Design of Residential
Areas | Adams. |
| (5) Town Planning & Road
Traffic | H. Alkar Tripp. |
| (6) A Handbook
of Town Planning | S. C. Oak. |
| (7) Valuation of Real
Properties | A. E. Mirams. |
| (8) Town Design | Fredric Gibberd |
| (9) Modern Housing Estates | Stanley Gale |
| (10) Town and Country
Planning | Martin S. Briggs. |
| (11) Patrick Geddes in India | Jaqueline |
| (12) 80 Designs of Buildings
for every purpose | Cement Marketing Co.
of India Ltd., |
| (13) Chandigarh | Punjab Government
Publication |
| (14) Report of Nagpur
Improvement Trust
Enquiry Committee | C. P. & Berar Govt.
Publication. |

Note—The list obviously excludes Institutional Journals, periodicals, magazines, reports, Government Publications, which are too numerous to be acknowledged individually.

CONTENTS

CHAPTER I *Introduction.*

1-13

(1) Planning age. 2. What is Planning and Why it is necessary? 3. Origin of towns. 4. Physical, sociological and Aesthetical Aspects. 5. What is Town-Planning? 6. Aims and objectives of Town-Planning 7. Aesthetics of Town-Planning 8. Community Planning. 9. Local, Regional and National Planning. 10. Contribution to Inter-national Planning. 11. Individuality of towns.

CHAPTER II *Physical Characteristics of Towns*

14-32 *my*

1. Siting of Towns 2. Types of towns. 3. Growth of towns. 4. Methods of external growth. 5. Mono-nuclear and multi-nuclear Cities. 6. Horizontal and vertical growth. 7. Causes of expansion of towns. 8. Metropolitan cities. 9. Garden cities. 10. Satellite towns. 11. Suburbs. 12. Green-belt. 13. What is Zonning and why it is necessary?

(XIV)

CHAPTER III *Town Planning in India.*

- 33-45 1. Town Planning in Ancient India. 2. Town Planning in British India. 3. Town Planning in Free India 4. Need of Urban planning in India.

CHAPTER IV *Element of City Plan.*

- Imp* 46-50 (i) Communications. (ii) Open Areas (iii) Built-up Areas. (iv) Essential Public Services. (v) Public Amenities (vi) Standards of Land Use Allocation.

CHAPTER V *Elements of City Plan.*

- Imp* 51-73 1. Importance of Communication and transport facilities. 2. Evolution of the road Transport system. 3. Functions of roads. 4. Classifications of roads. 5. Road systems:- Rectangular, Radial, Circular, Spider's Web 6. Town Planning and traffic problems:- (7) Segregation of traffic (8) Roundabouts fly-overs, and Clover leaf. 9. Parking Spaces. 10. Requirements of ideal road system. 11. Planning of Arterial and local roads. 12. Re-planning of existing roads, and

(XV)

measures for minimizing road accidents 13. Fixing width of Roads.

CHAPTER VI *Park or Recreational System.*

74-85 (i) Necessity of recreational facilities (ii) Features of public recreational system (iii) Selection of sites for parks, play-fields, etc. (iv) Various forms of Recreational amenities; Standard of open spaces.

CHAPTER VII *Sub-Division of Land.*

86-94 1. Main classes of Land-sub-division. 2. Principles of Sub-division (3) Elements of Sub-division 4. Parks and interior open spaces 5. Streets and Alleys. (6) Locations of Centres 7. Type Designs for land Sub-division.

CHAPTER VIII *Town and Neighbourhood Centres and Public Buildings-*

95-102 1. Town Centre 2. Neighbourhood Centre. 3. Public and Semi-Public Buildings.

CHAPTER IX *Planning of Industrial Estates and Shopping-cum-Business Centres.*

103-117

I PLANNING OF INDUSTRIAL ESTATE.

1. Priority for Industries. 2.

(XVI)

Classification of Industries. 3. Selection of sites for Industries. 4. Planning of Industrial Estate. 5. Grouping of Factories. 6. Industrial Housing.

II. PLANNING OF SHOPPING CENTRE

(i) The Market (ii) Shopping street (iii) Departmental stores (iv) The Shopping Precinct.

III. USE OF UPPER FLOORS ON SHOPS FOR OFFICES & FLATS

CHAPTER X *Housing.*

118-137

1. Priority For housing 2. Requisites of Residential Areas 3. Neighbourhood Planning 4. Lay-out of Residential Areas 5. Density 6 Types of Lay outs 7. Reilly Plan 8. Housing and Town Planning 9. Housing Problems 10. Types of Housing 11 Slums 12. Slum clearance and Rehousing 13. Decentralisation of Industries and Industrial Population 14. Housing and the State (i) Housing of Industrial Labour and Low Income Group. (ii) House ownership-an Approach to Indian Housing Problem.

(XVII)

CHAPTER XI *Master Plan.*

138-169

- mp* (a) Definition (b) Object of Master Plan (c) Flexibility of the Master Plan (e) Civic Survey (f) Scope of Civic Survey. (g) Preparation of Master plan:- 1. Population ② Density 3. Over-spill 4. Greenbelt 5. Neighbourhoods 6. Town Centre 7. Industries 8. Roads (h) Planning Team. (i) Functional Approach to Town Planning (j) Financial consideration (k) Legal Status of Master Plan (m) New Crawley Town and Chandigarh Master Plan (Illustration)

CHAPTER XII *Civic Design.* •

170-180

- mp* (i) Town Planning and Town Design (ii) Land scape Architecture.

CHAPTER XIII *State Control on Land Ownership.*

181-197

1. Rights of ownership 2. Building, Zoning and Private Lay-out Regulations (A) Building Regulations (in general) and Nagpur Improvement Trust Regulations (in particular) (B) Zoning Regulations (C) Standard of open

(XVIII)

spaces (D) Private Lay-out Regulations.

2. Existing Town Improvement Legislation and the law of Compensation 4. Principle of unearned increment 5. Betterment 6 House-ownership and Tenure 7. The Town and Country Planning Act of 1947 in England.

CHAPTER XIV *Land Acquisition, Improvement Trust and Town Planning Acts.*
198-223

- ✓ 1. Land Acquisition Act of 1894.
 - ✓ (i) Aims and objects (ii) Award
 - ✓ (iii) Procedure to be followed.
- 2. Improvement Trust Acts. (i) Necessity of Improvement Trusts (ii) Working of Improvement Trusts (iii) Types of Improvement Schemes (iv) Procedure for Preparation of Improvement Scheme
- ✓ (v) Acquisition of land for improvement schemes (vi) Betterment
- ✓ (viii) Abandonment of Acquisition
- ✓ (ix) Finance (x) Recurring and non-recurring Income (xi) Building Zoning and Lay-out Regulations (xii) Dissolution of Improvement Trusts.

(XIX)

(3) *C. P. & Berar Town Planning Act of 1948.*

- (i) Main features of the Act (ii) Three stages of Valuation (iii) Calculation of actual percentage for assessing betterment Contribution (iv) Statutory Authorities in the Act.

Chapter xv *Valuation of Immoable Properties.*

253

1. Definitions of important Terms in valuation 2. Methods of valuation of open and built up properties 3. Illustrative example of valuation of built-up property.
-

ILLUSTRATIONS.

Fig.	Page
1. Original proposal of Municipal Council to improv. an old quarter, in a South India Town, by driving straight road.	45-1
2. Proposal of Sir Petric Geddes, to improve the same area (applying the principles of conservative surgery).	45-2
3. Percentage distribution of land in a Town, for various uses.	50-1
4. Three common types of Town plan.	73-1
5. Type design of Round-about	73-2
6. Clover-leaf Grade Sperator.	73-3
7. Right and wrong way of planning Arterial roads.	73-4
8. Diagram showing correct layout of Arterial, Sub-arterial, and local roads for a Residential sub-division.	73-5
9. (a) Type design for 60' Sub-Arterial road. (b) Type Design for 30' Local Road.	73-6
10. Type design for 100' Arterial Road.	73-7
11. Type design for an Arterial Road (146' wide) carrying Trams, proposed in Greater Bombay, Master Plan.	73-8

(XXI)

12. Diagram showing ideal park system 85-1
for a town designed by Mr. G. L.
Parker.
13. Rectangular layout with combination 94-1
of big and small plots.
14. Layout for sites of various shapes. 94-2
15. Contour plan of site proposed to be 94-3
laid out for a new suburb or village.
16. Wrong way of planning the area 94-4
(in Fig. 15)
17. Right way of planning the area (in 94-5
Fig 15).
18. Nagpur Improvement Trust's layout 94-6
for Ambazari Basti Precinct, Nagpur.
19. Layout for Low income Housing 94-7
Precinct (Shankar Nagar) Nagpur.
20. The Market. 117-1
21. The Shopping Street. 117-2
22. Shopping Precinct. 117-3
23. Diagram showing Neighbourhood 137-1
Principle.
24. An attractive layout, with a short 137-2
detour of building plots and building
lines.
25. Cul-de sack. 137-3
26. Layout with Plenty of variations. 137-4

(XXII)

27. Shoe-Strng development. 137-5
 28. Detached, Semi-detached, and Row 137-6
houses (Plan).
 29. Detached, Semi-detached, and Row 137-7
houses (elevation).
 30. An attractive layout for Flats or 137-8
apartment buildings.
 31. Sky-Scraper. 137-9
 32. Bloomsbury Precinct proposed in the 169-1
County of London plan.
 33. Plan showing existing development of 169-2
Crawley Town (near London).
 34. Plan showing proposed development 169-3
of Crawley Town.
 35. Chandigarh Master Plan. 169-4
 36. Layout of Sector 22 Chandigarh 169-5
Plan).
 37. (a) $63\frac{1}{2}^{\circ}$ Air Plane. (b) 45° Air Plane. 197-1
 38. (a) $63\frac{1}{2}^{\circ}$ Light Plane (b) 45° AirPlane 197-2
and Road width.
-

CHAPTER 1

INTRODUCTION

(1) PLANNING AGE :

Planned living, distinguishes a man, from the rest of the Creation. At no period, in the History of man, Planning has been in the forefront as today. The whole world, is bristling today with Planning activities, in various fields and at various levels, from Defence Planning, Industrial Planning, Town, Country and Village Planning, right down to family Planning, in the domestic affairs. In fact, the age, in which we are living, can be rightly called a Planning Age. Our India is also not lagging behind and has already completed its first Five Year programme, for all round development of the Country.

(2) WHAT IS PLANNING AND WHY IS IT NECESSARY ?

By Planning, we mean pre-thinking and pre-arranging things before an event occurs, in order to get, best results, in Comforts, Convenience, Health, Happiness and Efficiency. The object, behind all Planning activities, is to correct the mistakes of the past and to be wiser

(2)

for the Future. In fact, majority of the present day evils, are due to lack of Planning and that is why there is need of Planning, in every human activity.

(3) ORIGIN OF TOWNS.

The first job, to which the pioneering man, set his hand, was to alter the face of the Country and create out of the jungles, environment necessary for a settled life, which was characterised by permanent agriculture, permanent shelters for protection against wind rain, etc. Man is primarily a social animal, it was on account of his gregarious nature that he always preferred to live in groups, forming camps, hamlets, villages which as the population increased, expanded into towns, towns into cities, and finally cities into the highly concentrated 'Metropolises' of the present era (London, Bombay and Calcutta, etc.)

(4) PHYSICAL, SOCIOLOGICAL AND AESTHETICAL ASPECT

(i) Problems of town-planning are approached from one or more of these three aspects, the sociological aspect, being the most important of them. Sociology, is defined, as the science of the development of the nature and laws of Human society and in its application to Town-Planning, it deals with the relation

between people, the development of communities and the growth of population. In its relation to Town-planning, it embraces all such questions as statistics of birth and death (especially infant mortality) distribution of industries, trades and other occupations, which form the basis of the urban economic structure, problems of Education, Medical relief, Housing, Communications and Transport, and all other needs (Social, Cultural, Recreational etc.) which contribute to comforts, conveniences, prosperity and happiness of the urban community.

(ii) In its Physical aspect, the town is looked upon, as an inorganic body and the town is identified with the land available, within its limits, which goes to form its physical structure.

(iii) In the aesthetic aspect, main consideration is given to 'Beauty'.

In this connection it would be worth while, to have a glance at the History of TownPlanning in Europe and see how it progressed, during the last 100 years of its History.

The progress was in three stages. In the first stage, town planning was synonymous, with Town Ornamentation, through Monumental Buildings, Vistas, Boulevards, extensive Gardens, Parks, Park-ways etc., where mostly, Architects

dominated the field. It was in this period that ambitious schemes of reconditioning and reconstruction of Paris took shape, which transformed the city into 'Paradise' of Europe

In the second stage, stress was laid on zoning which meant dividing the city, into districts or zones according to use (Industrial, Commercial and Residential zones etc.). Any other use was strictly prohibited and so there was less chance for any one zone, creating nuisance to the other especially as each zone was segregated from the other. So in this stage, physical organization of the town was identified with town planning, of which zoning was the essence.

The Social concept of the city, marks the third and the latest stage of its progress which began from the early days of 20th century when eminent Sociologists like Sir Howard Ebenzer, Sir Pettrie Geddes, Lewis Mumford, stepped into the field of Town-Planning for the first time.

The name of Geddes, is well known in the history of India. This well-known, sociologist town planner, of Scotland, came to India in 1915 at the invitation of Lord Pentland, the then Governor of Madras, to give expert advice, on the problems of Town planning and Improvement, in India and his reports on town

improvement schemes of various towns, in India (i.e. Indore, Calcutta, etc.) would show, how he was far in advance of his times or generation. In fact, he was the first man, who introduced the social concept of the city in India. According to him Town Planning, primarily meant, the provision of three-fold requirements of 'Folk, Place and Work', which corresponds to the triad of 'Organism, Function and Environments, in Biological terms. According to this Concept the city came to be looked upon, as a Physical utility, for collective living and a living organism which like all other living creatures, is governed by definite laws of growth and where Environments played a great part. The City is no longer a mere physical structure but it now means the people, the individual families and the Communities, they formed, their Places of Living, Work and Play; so human needs were considered uppermost and Physical organization was only an instrument, to meet those needs. So the yard stick, to measure, whether the town is good or bad, is to see how far, the town goes, to cater to these human needs, both individual and collective.

(5) WHAT IS TOWN PLANNING ?

Town Planning is now defined as an effort to shape and guide the Physical growth of towns, according to various needs of the Commu-

nity viz. Social, Cultural Recreational, etc. By exercising a proper control on the use of the available land, it seeks to provide healthy environments for all people, both rich and poor, to live,—to work, to play or relax and thereby bring about, the highest possible degree of their Economic and Social well-being. The touch stone of what constitutes planning is the matter of relationship and the accommodation of several units to make a Harmonious whole, or in other words, 'Unity in Diversity.' 'Prevention, is better than cure' is its slogan, Efficiency and Health, Utility and Beauty, are its watch-words.

It may be pointed out in this connection that though the term primarily applies to Planning of new cities on virgin soil, as in the case of New Delhi, Bhuvaneswar, Chandigarh etc, it holds good equally for Improvement or Replanning of the existing towns and also their extension over, fresh areas, as the principles in both, are more or less common.

(6) AIMS AND OBJECTIVES OF TOWN PLANNING 12

The Planner, before he begins to plan, must know what he is aiming at i.e., the Plan must have clear and definite objectives, with due consideration, to the past heritage, future

(7)

ambitions and the potentialities of the city, to be planned or re-planned.

The objectives of Town Planning, as defined in the Town Planning Acts may be summarised in three words viz Beauty, Health and Amenities; but they are too vague. They may be more precisely stated as under:—

- (a) To promote healthy surroundings and environments for people to live and to work.
- (b) To Use the right land for the right purpose and to avoid mutual conflicts by proper zoning.
- (c) To provide for all the needs of the town and its people viz Economic, Social, Cultural, Recreational etc.
- (d) To encourage all commercial, industrial and business enterprises, which would give large-scale employment and bring prosperity and wealth to the Town, by providing all facilities (cheap power, cheap sites and cheap services like Water-Supply, Drainage, Electricity Transport etc.)

(7) AESTHETICS OF TOWN PLANNING:—

Man has a natural craving for 'Beauty', and so utility & beauty must go hand in hand.

The beauty of one's environment is an important factor in the happiness of mankind and that is why so much stress is now laid on the aesthetical side of town-planning, in which every opportunity is taken by the Planner, to introduce an element of beauty. The accomplishment, of beauty depends upon Creative, Preventive or Destructive effort; Creative in the sense of enriching the Plan Pictorially, Preventive by way of Control, Destructive, by the removal of everything which is ugly and unsightly.

Beauty of a town in its modest form, stands for Preservation of trees, natural greenery, improved types of domestic buildings, architectural control on public and semi-public buildings and such other positive and negative measures, which seek to ensure its civic dignity and beauty. It also includes the the preservation of all ancient architectural buildings, temples, shrines and all other buildings, of cultural and historical importance. Modern town planning is no more a control of two dimensions (length and breadth) but it must take into account the third dimension also (Height).

(8) COMMUNITY PLANNING.

By Community, we understand a group of people, who feel themselves bound by Common

ties of belonging and a feeling of comradeship and a sort of community spirit and loyalty to the particular Locality or Mohalla. By contrast, a Society is only a collection of people, gathered from all quarters without any common ties.

The basic unit of Society is a family. The family means the house, with all its environments and living conditions etc. So the primary object of all community planning, is development of community life and neighbourly relations. To achieve this end, a new technique for layout of residential areas has been evolved and this is what we call "Planning on Neighbourhood Unit Principle." Each unit which has about 10,000 population is made self-contained with all its daily needs provided in the unit itself. It may be pointed out here that this principle is not new to us, as the Town-planning practised in India was based on this very principle. Accordingly, each town was divided into a number of 'Mohollas' which were more or less self-contained. Each moholla had its own character and individuality and formed the object of pride for its Residents. Each moholla arranged its own social and cultural activities (like Rang-Panchami, Ganesh-Festival, etc.) in which all men in the moholla took active part.

(9) LOCAL, REGIONAL AND NATIONAL PLANNING

According to Authority held responsible for the planning of any subject or subjects, planning is divided into three categories namely Local, Regional and National. For example, matters of National importance like Railways, Irrigation and Hydro-electric works, Heavy Industries, which are to be planned at National level, come under National Planning.

Matters of local importance, like Water-supply, Drainage, Markets etc. which are meant to serve the local needs of a town, come under Local planning.

REGIONAL PLANNING

By regional planning, we mean planning of a much larger unit than a town, called 'region', on more or less the same principles as town. By region, we mean all that territory, which is subject to the influence of the parent city and generally lying within its easy reach by road or rail and over which, the city would eventually spread its boundaries. The region may extend from 10 to 30 miles (about one hour's journey by rail) from the centre of the city and engulf a number of villages and townships.

The Regional plan provides for developing the whole region in a coordinated manner. It

tries to keep in balance, the needs of the town and the country-side and also of industry and agriculture. All common needs of the region, such as regional highways, regional transport, regional water supply and sewage disposal schemes, find a place in the regional plan. Besides providing for development of existing villages and towns in the region, it provides sites for new satellite towns for rehabilitating the displaced persons from the parent city. The Master plan prepared for Greater Bombay may be cited as an instance of Regional Planning.

An important point to be stressed in this connection, is that there should be no conflict of any kind, between the three plans, especially where one and the same item is planned at more than one level, for instance, a plan for National Highways, Regional Arteries and the main throughfares of a city, must fit in with one another, for obvious reasons.

(10) CONTRIBUTION TO INTERNATIONAL PLANNING

The modern subject of town planning is not the invention of any one nation or a group of individuals. It has evolved during the last fifty years as a result of International pooling of experiment and experience. America,

France and England, may be mentioned as the countries which have made substantial contribution to the Art and Science of Town Planning. France's contribution lies, in her bringing to perfection, the technique of modernizing an existing town, of which Paris is a classic example. The principle features of this technique, were (1) Long straight streets with terminal features, (2) Passion for vistas (sometimes carried too far), (3) Unity of conception in architectural treatment and landscape design (4) Boulevard character of main streets, (5) Preference to driving new streets through slums and decayed quarters to widening existing narrow roads, (6) Inclusion of Garden features, through the town. England's Contribution though one sided, is no less important. It lies in low density Garden cities, and satellite towns, besides low density type of Residential planning, which have considerably influenced, the suburban planning in other countries.

America's contribution has been varied than England's. Introduction of diagonals in the monotonous grid-iron of streets, passion for civic centers and Parkways and a well organized park-system are her important contributions. Height zoning, which came later, has also been a highly specialized aspect of civic control in America.

(11) INDIVIDUALITY OF TOWNS.

Another point, which deserves special emphasis is the question of 'Individuality' of towns. Just as one man differs from another in face, complexion, stature etc, so also every town differs from another, in its geographic position, natural features, climatic conditions, topography and its industrial and commercial potential. So every town must have its own plan. The plan of one town, cannot fit in with another town. So in order to evolve a realistic Plan, the town must preserve its individuality and should be developed on a pattern, suited to its physical features and geographic, economic and social conditions.

It would not do, to shake into a bottle, the Parasian Boulevard, the English Garden village, the American Civic centre and the continental Park-system, to produce a mechanical mixture, which might be indiscriminately applied to every town, in the hope that a town would be planned according to up-to-date notions of of Town planning.

CHAPTER II

Physical Characteristics of Towns.

(1) SITING OF TOWNS:—

Towns, as they exist today, are a result of evolution, rather than per-thought or pre-planned development. The siting of most of the old towns, was more a matter of chance, than design. The considerations, which then influenced the selection of sites for towns were defence, trade, a central place for market, water supply, etc. It is the last factor, that accounts for the siting of most of the Indian Towns on the river banks or at their confluence, apart from the considerations of holiness which they claimed, according to Hindu notions.

(2) TYPES OF TOWNS:—

Elements, which distinguish one town from another are—(i) location, (ii) function, (iii) shape, and (iv) size. In many cases, these elements are reflected in their names or their description, e. g. river and port towns, hill stations, suggest, their respective location. Terms like pilgrim towns, fishing, industrial and commercial Towns, indicate their dominant performance or function. Many times, a town changes its character and comes into lime light,

for political or other circumstances, such as discovery of a mineral, change of capital, etc.

The shape or pattern of the town is more, or less influenced by the pattern of its street system, which in turn depends upon its physical or topographical features. So, according to the pattern of road plan, the town is described as rectangular, radial, circular or a combination of radial and circular, (commonly known as "Spiders Web"). The radial plan, suggests growth of the town, around some central feature, such as a palace temple, church, market place, etc. which is readily accessible, by radial roads. The rectangular pattern, suggests the evenness of the ground and possibility of unlimited expansion of the town, in all directions. The Grid Iron plan is very common, in American towns.

The size or stature of a town is generally limited by its industrial and commercial potential and so every town, cannot aspire to get the stature of a metropolitan city, like London or Bombay.

The size of a town is determined by the size of its community, i.e. its population. A community, of less than one lac population, may be roughly called as a town and that with a population between one lac and ten lacs a city and

the large ones (with population of say ten lacks and over) which are, industrial and commercial centres, of international importance, may be called 'Metropolitan cities.'

(3) GROWTH OF TOWNS:—

In this world of change, no town remains, for long, in a static condition. Either it must be in a state of alteration, expansion, depression, deterioration or decay. In this respect, towns behave like living creatures and have their own cycle of growth. All of them, have grown from small beginnings, into their present sizes. On one side, they have their own individuality and on the other, they mark, the civilization, in which, each particular town or city is a constituent. During the last generation, there have been various attempts, to summarise, the course of city development and to co-relate it, with rise and fall of civilization. The four important stages of city growth, generally recognized are:—

(i) Polis:—A small urban unit, of a self-contained community, united by bonds of either blood, love, friendship, neighbourly or business relations, and having a common deity, temple, market place, etc.

(ii) Metropolis (Mother city):—A city grown to its full stature, with a large population and high

potentialities, (viz. command of land or water routes, more defensible site, facilities of public services, such as transport, water supply, drainage, electricity, etc.)

(iii) Meglropolis:—A city which has *over-grown* into a mess, due to over-expansion of industries, over-investments, domination of machinery and a mania for everything on a gigantic and mass scale. viz. multi-storeyed buildings, multitrack roads, mass constructions, mass transportation, highly mechanized transport, etc. In its gigantism, lie the germs of its decay.

(iv) Nekropolis:—City of the dead. Wars, famine, disease, depression etc., wipe out the city and it then becomes only an object, of historical or archeological interest (old Rome, Babylon, etc.).

(4) METHODS OF EXTERNAL GROWTH.

There are, four methods of external growth viz. (i) Concentric spread, (ii) Satellite, (iii) Ribbon and (iv) Scatter.

(i) CONCENTRIC SPREAD:—

In the concentric type of growth, the town develops in the form of concentric rings, the

main object being, to keep to the centre or heart of the town, as far as possible.

(ii) SATELLITE:--

The satellite form of growth implies dependency (generally economic) on parent city. After a town has reached a certain size, some form of satellite devolution, is desirable, to break its continuous sprawl beyond that size, as with the periphery getting, further, from its heart the city becomes less convenient and less comfortable, due to the fact, that the town services become less effective and less economical.

(iii) RIBBON DEVELOPMENT.

The growth of the town in the form of a ribbon or line (usually a single row of houses) so very common, along bus routes, Railway lines, near bus-stop, Railway stations etc., is called ribbon development or growth. It starts usually as spot growths, in very short lengths but ultimately roll, in interminable lengths if not checked in time. To start with, it has only length but no depth but very soon, it attains depth also, as the area develops laterally. Ultimately, the whole area, develops into a full-fledged town. Ribbon development, has been a common feature of our towns and that is why, we find that most of our

highways, are passing through the heart of shopping and business centres (for example Itwara, in Nagpur). This type of development is most dangerous, from traffic point of view and has given rise to most of the present traffic problems. That is why, it is very necessary to nip it, in the bud, or at-least check it under, Building and Zoning regulations, at the initial stage.

(iv) SCATTER.

Any erratic growth, without any order, comes under this type.

(5) MONO-NUCLEAR AND MULTI-NUCLEAR CITIES:-

The natural tendency of towns, is to grow around an existing nucleus, such as a village, a civic centre, a commercial centre, etc. In the case of mono-nuclear cities, the population is concentrated round a single centre, while in multi-nuclear cities, the same population, is distributed round a number of centres to prevent over-concentration at a single centre and that is why the latter are advocated by modern town-planners.

(6) HORIZONTAL AND VERTICAL GROWTH.

The growth of the Population in a town, can be accommodated in two ways viz (i) deve-

loping more and more areas and extending the existing built up areas, horizontally, in all directions. (ii) extending the town only vertically, by adding more and more floors to the existing buildings or by constructing new multi-storied buildings generally known as sky-scrapers. The former, which has very low density, is called 'Horizontal expansion.' The latter which has a very high density, is called 'vertical expansion.' 'Horizontal expansion is more suitable for cities, in a poor country like India, while vertical expansion, is advantageous only in highly industrialized cities, where the cost of land is prohibitive, as such Buildings require large investments of funds, besides high technical knowledge in their design and construction.

(7) CAUSES OF EXPANSION OF TOWNS.

The growth or development of towns and growth of its population always go hand in hand; so the causes of the growth in both cases, are almost identical.

(i) Facilities of communications, in the various forms' given below, are, at the root of the increase in the population and also in the growth of the towns, to which, they owe their prosperity and happiness.

(a) ROAD-WAYS.

The importance of Roadways, as means of approach, to towns and to every building therein, is obvious.

(b) RAILWAYS.

Through the aid of passenger and freight services, which the Railways provide, the field of living, has been extended, beyond local limits of towns. The mass transport of passengers, goods and articles of food etc, from far off places, has been made possible, only, by means of Railways.

(c) WATER-WAYS.

The water-ways, the ocean Liners, the ports and harbours have played an equally important part in the development of, maritime or port towns, which are the chief medium of transport, of Raw materials and manufactured goods, from and to, foreign countries, across high seas.

(ii) The growth of the city is largely the result of new methods of local transport, which facilitate movement of goods and passengers, over larger areas, into which, the towns expand, (viz, buses, trams, surface railways, tube Railways etc).

(iii) Vertical development of the cities, has been made possible, by new means of vertical transportation, in the form of mechanical elevators or lifts, which have now become an important appendage of modern multi-storeyed buildings and sky-scrapers.

(iv) The attractions of the modern amenities for comfort, convenience; recreation, etc. combined with the opportunities for material gain and for fulfilment of ambitions, for lucrative careers or professions, are responsible for increased drifts or migrations, to the city, from all over the country.

(v) Excellent facilities for Higher education, Research, (viz, Research-Institutions, Colleges, Libraries, Museums, Zoos, Botanical Gardens, etc.) attract a large number of students and research scholars, to the cities.

(8) METROPOLITAN CITIES:— ✓

The period of 'Industrial Revolution' (1760-1820) marks an important epoch, in the history of the growth, of all cities in general and the present metropolitan cities, in particular. In their case, their high industrial and commercial, potential such as strategic position, command of important land or ocean routes,

was, at the root of their phenomenal growth, combined with the other causes, such as mechanized transport, etc., referred to before. As a result of these various factors, these cities, soon became important manufacturing and commercial centres in the country and in course of time, assumed international importance. Investors, manufacturers, commercial magnates, Banks, Insurance Companies, soon dominated the metropolis and it became a reservoir of capital. All people looked forward, to the metropolis, for opportunities, to make money to exercise influence and to enjoy, all pleasures of life. Architectural buildings, constructed in in various styles and grouped round artistic plazas, in the various centres (viz. civic centre, commercial centre, recreational centre. etc.) made valuable contribution to the civic dignity and beauty of the metropolis. Arcaded streets, extensive parks and gardens and multi-storeyed buildings bordering on both sides of the arterial highways, became its normal feature.

In short, the metropolis was considered as 'Heaven' and all roads led to the metropolis. No doubt, it did continue to remain so, till such time, the growth of the city, was within reasonable limits, (say 5 to 10 miles round the centre) but very soon, this limit was over-stepped and

the over-grown city, became a mess and a muddle, with all its attendant evils (Meglopolis). Some of these evils are referred to below:—

(i) Excessive size led to the separation of country side, pure air, breeze etc.

(ii) A long uncomfortable journey of any thing up to two hours, from and to, place of work and place of residence, was a shocking waste of time, energy and money.

(iii) Every road became a highway. The residential and shopping areas, got mixed up and the buildings on opposite side were separated, as if it were, by death.

(iv) Noisy traffic past Hospitals, Schools, Colleges, public offices, libraries, formed a permanent disturbing factor to their peace.

(v) For want of pre-planned sites for schools, near the living places, children have often to travel in trains, buses or trams, to go to their schools, which were mostly located on busy streets in rented buildings, unsuited for the purpose and the mother, has to wait anxiously; every day, for the safe return of her child, from the school.

(vi) Indiscriminate siting of Industries in the heart of the town and failure to provide, in advance, for the residential accommodation of the increased industrial population, gave rise to slums and sordid suburbs, with their attendant evils, creating new problems.

(vii) Overcrowding and congestion on the roads, resulted in a considerable loss of human life from the alarming number of road accidents.

(viii) Inadequacy of open spaces for Recreation took its own toll of juvenile crime and delinquency.

(ix) Social and cultural life was almost absent, so much so, that one did not know his next-door neighbour.

It will be seen from the above, that the picture of the living, in a Metropolitan city, had both its bright and dark side but the liabilities far exceeded the assets and so on the whole, the picture was dismal and disappointing. It was to eradicate some of these evils that Schemes of large scale Planning or Replanning of these cities, were subsequently taken in hand in most of these cities. In fact, many of the ideas of

Modern town Planning, originated, in the need of finding satisfactory solution to the various problems, which the Metropolis, presented viz. Garden-city, Green-Belt, Satellite town, etc, described below.

(9) GARDEN CITIES.

The clearance of slums created by the Industrial population in industrial cities and re-housing the persons so ejected, is one of the most difficult Problems that a town planner has to tackle. Sir Ebenezer, an Englishman, may be said to be, the first modern thinker, of cities, who had a sound sociological conception, of the dynamics of rational urban growth and the credit of the first conception of the new method of city development, goes, to him. According to him, the solution of the problem, lay in the gradual decentralisation of the industries and the industrial population, in new towns in rural surroundings, to be planned, on what is known as the 'Garden City principles.' The main features or aims of the Garden Cities are:—

- (1) To control the growth and population of the new town, by providing a permanent reserve of open country called 'Green-belt' round the periphery of the town.

(2) To secure the advantages, of both rural life viz., fresh air, cottage homes, gardens, play fields etc. and also amenities of urban life viz. schools, churches, temples, theatres, health services like hospital, maternity home, shops, social and recreational centres etc.

(3) To provide for variety of employment for all classes, by inviting and attracting, a variety of Industries.

(4) To provide for houses, of different sizes, to suit all sizes of family.

(5) To eliminate the private land-lord and to control and finance the whole town, through public utility corporation.

(6) To lay out the Area on the principle of 'Neighbour-hood unit planning.'

(10) SATELLITE TOWNS:—

New Towns which were developed just outside the green belt of the parent city, were called Satellite Towns. These towns, depend on the parent city, for work or employment and for their weekly or monthly needs and for special requirements, such as university education etc.

Ordinary daily needs, such as a primary or nursery school, a small shopping centre, a Dispensary, etc, are provided, in the town itself. Only for special purposes, say for higher education, Hospital treatment etc, it was necessary to go to the parent city. Invariably these towns were connected, with the parent city, by an efficient system of transport service, such as buses, local trains etc.

(11) SUBURBS.

The suburb was an inevitable creation of Metropolitan living and came into existence, as an important appendage, of the Metropolitan cities. They usually sprang up, on the Bus routes or near railway station. They usually served as dormitories and for want of necessary facilities, lacked in the fundamentals of social and cultural life. The advantages of the suburb were, however pure air, water, rural beauty, and an atmosphere of peace, away from the din and smoke of the city. Essentially the suburbs originated as dormitory towns and even for daily needs, they had to depend on the parent city. Some of the Garden Suburbs which are specially laid out, in the proximity of some of the cities, are of course exceptions.

(12) GREEN BELT.

It has been accepted on all hands that the roots of most of the evils, of Urban living, lie in the gigantic size of the city and over-concentration of the population. The remedy, to minimize these evils, lies in limiting its continuous growth by reserving, a stretch of open country, all round the city, which is kept free, from all building operations. The open belt or country, so reserved, is called 'Green Belt.'

The Green Belt, is now considered as an essential requirement, of all modern towns. The important functions of the Green-Belt are:—

(1) The Green Belt is primarily meant for Agriculture, specially intensive cultivation of vegetables and fruits, which can be supplied, fresh to the town; it is also meant for farm industries, like Dairy, Poultry farms etc., which supply some of the daily needs of the city.

(2) It also provides sites for recreational Amenities such as play-grounds, play-fields, Parks, which may be necessary, to make up, the deficiencies of Recreational open spaces in the City proper.

(3) The main object of the Green-Belt is to prevent urbanization, beyond its outer ring, though it may incidentally serve, as an emergency reserve, as it were, in case, special circumstances demand further expansion beyond the, prescribed limit.

(4) It serves as a sanitary cordon, to prevent growth of slums, on the periphery of the town or atleast, to keep such growth, at a safe distance, from, the town.

(5) The object of 'Green Belt,' is to limit the size of the town but not the population; it only means that the increase in the population, beyond the Green Belt limit, will be provided in new satellite townships, into which, the existing villages will be allowed to expand.

✓ (13) WHAT IS ZONING AND WHY IT IS NECESSARY?

Zoning has been defined as the creation by law, districts or Zones, in which regulations differing in different zones prohibit injurious structures and injurious uses of land. Where there is no zoning, owners of private land are free to use it in any manner they like, with the result that factories encroach on business sections and residential areas and in a short time, the whole city becomes a patch-work of mixed

uses, resulting in disorder and chaos. This chaos can be avoided if the use is controlled under Zoning regulations early in the life of the city. The three important zones into which the city is usually divided are zones for (1) Residential purpose (2) Business and shopping (3) Industrial purpose. The areas meant for recreation are said to be 'reserved' for recreational purpose and not 'zoned' for it.

The essence of zoning is utilization of the available land to the right use and the correct location of each zone with respect to the others so that there will be no conflict in the uses and no nuisance; for example, the Industrial areas must be properly segregated from the residential areas so that the latter may be immune from any nuisance, from smoke, dirt, noise etc. That is why the location of industries which are the source of so many nuisances should receive the most careful consideration.

Besides use of land, there are other matters such as height, volume of the building, which also require to be controlled; for example, tall buildings impair the value of neighbouring building, of lesser height, by depriving it of light, air, breeze etc., and increase the congestion of traffic, on the street.

Important matters controlled under zoning regulation are (i) character or use (ii) Density or coverage of the plot (iii) Height (iv) Facades of buildings.

The density is regulated by prescribing the proportion of built-up area to plot area, (normally not more than one third to half the plot area) and also by restricting the number of stories to be constructed. The height of the buildings is regulated according to the width of the abutting road (usually not more than half the width of roads). The control on facades of Buildings is meant to introduce an element of beauty and to have artistic composition of buildings, particularly these of public character and also those in the main shopping and commercial centres.

Most of the evils of our towns are due to lack of zoning and that is why zoning is considered to be the essence of modern Town planning.

CHAPTER III

Town Planing in India.

TOWN PLANNING IN ANCIENT INDIA.

Town-planning is not a new idea or science but it is as old as civilization itself. In the past Indian civilization had risen to great heights in several periods of History and evidence given by excavations of some of the old Towns like Taxashila, Harappa etc., shows that it was one of the cradles of Town-Planning. Some of our Sacred books give detailed account of the methods of laying out cities and towns. For instance, it is written in Viswa Karmaprakash, "First lay-out the Towns and then plan the houses." This principle continues to hold good even today. In some of the ancient works, there are detailed recommendations given for selecting sites for Towns and laying them out. For instance, here is a description from 'Mahabharat' of the city of Indraprasatha (Ancient name of Delhi) "It was furnished with gates, towers and palatial buildings. There was a fine lay-out of spacious thorough fares, there were artificial hills, numerous tanks brimming with water, beautiful lakes, fragrant with lilies and lotuses and lively with a variety of birds, many beautiful parks and gardens, with

tanks at the centre and also numberless fine ponds".

This pictures to us, an obviously beautiful city. Some of these old books, even refer to the qualification and moral qualities of the city, planners (Sthapati) to the effect that 'He must have mastery over the entire science of agriculture and planning, besides being familiar with the cultural ideals, social, and religious predilections of the people, for whom he had to build. These qualifications even hold good today. Also a reference to the 'Artha-Shastra of the great 'Koutilya', the Minister of Chandragupta shows that the principles of Town Planning were understood and practiced, as long back as third century B. C. For example, the principle laid down in the book for grouping of the communities, specially those engaged in trade and handicrafts, corresponds to the principle of "Zoning" in Modern Town Planning. There is also a reference in the same book, to the principle of laying out the main roads in a town, which says that every town should have at least six high ways (Rajamarga) parallel to the Main cardinal directions. This corresponds to the Grid-iron plan, advocated for streets by Town planners so far. In fact, Hindu Town-planners were not in favour of diagonal roads. The book

also adds that these Rajamargas should not be less than six dandas i. e. 30 feet, which means three lanes of traffic. The width of streets advocated above, may be found to be too liberal, when compared to the streets in the old parts of our town (Nagpur) where we may not find even six roads of this width. In his writings on India, Euen Thasang, the famous Chinese traveller speaks highly of some of the ancient towns, particularly Pataliputra (Patna) Kanoj, Sakal, Mathura, which he found to be neatly laid out and well planned.

All this, would show that town planning was practiced in India as long back as 2000 years, to suit the then conditions, though not in the full sense that we understand and desire it today.

India had a rich inheritance of an old culture and traditions, which included some typical plans for the layout of towns but few traces were left in the existing town, except where the town had a dominant feature. Very often this dominant feature was an ancient temple, which occupied a prominent position in its centre and all roads and lanes led to it. It was built in the traditional architectural style, characteristic of its age, symbolic of the cultural attainments of

the people of the Region. Its spacious fore-court or Sabha-Mandap, supplied both a common meeting ground and a public platform and formed the hub of all religious, social and cultural activities of the town. In short, the temple played much more active part, in the ancient town, than what the community centre plays in the modern town.

Indian tradition was far wiser with its use of narrow and zigzag lanes, opening into pleasant squares, each containing a shady tree or trees. The narrowness of the lanes made for shade and quietness and left the building site, large enough to enclose, a court yard and gardens. This was quite in conformity with the modern practice of Neighbourhood planning, which scrupulously avoids stright and unneces-sarily wide roads in Residential areas.

The transition in an Indian town, from narrow lanes, wider streets to more spacious highways (Rajmargas) and from mud houses, Wadas or Kothis (Superior court yard types of houses for the well to do and the rich), the Palace, to the ancient Temples and Shrines, distinguished for their high architectural beauty, formed inseparably inter woven structure. In other words, there was 'Unity in Diversity' in

the traditional town a well known principle so much emphasized in modern town planning.

The traditional Indian household, contained many families grouped round grand-parents. Each community had a number of common ties of antiquity and strength, blood and faith, of caste and occupation and linked with these, a tradition of collective action and philanthropy of the rich, towards their proper brethren. The craftsman and artist at their labour, the house wife at her daily household work, the girl looking after the baby, the sweeper at his humble round, all and each were helping their town towards its development in health and wealth. In short, the traditional town lived a community life to the full and was second to none found elsewhere in the east or west.

Unfortunately, India failed to keep up its old traditions and culture, for long, for various reasons. In the first place, these traditions, which were probably 2000 years old, had gradually lapsed since a settled unity of India was more an exception than the rule. The lapse of local Government during several centuries, reduced larger towns to disorderly aggregations of dwellings, with inadequate communications and serious congestion in many quarters. The

segregation of caste groups and the tendency of families to remain together, through several generations were two important factors, conducive to this state of affairs. A trade caste occupying a certain quarter, hemmed in by others, had no other course open but to build more intensively. The same thing happened also with the house shared by a joint family. As the family expanded, intensive building was resorted to, to make room for the additional members with disastrous results.

This process of deterioration of the Indian town, continued unabated, throughout the pre-British period and even the British rulers took nearly a half century, to realise that something was going wrong with the towns and that some action on their part for arresting their haphazard growth, was necessary, in the public interest. When the Britishers first settled in India, they found that the conditions in the town were so unhealthy and noisy that they thought it fit to start independent colonies, mostly as extensions of the existing town. These extensions came to be called as 'Cantonments' for the Military occupied areas and 'Civil Lines', for the areas occupied by Civilians and other well-to-do people, but they soon realised that they could no longer leave the old town

to its own fate and that some positive action for improving its conditions was necessary for the common good of the old town and its new extension.

TOWN PLANNING IN BRITISH INDIA.

The first phase of town planning or town improvement in India, with which the British began, was street planning, which aimed at cutting geometrically straight roads, through the congested parts of the town, regardless of its costs or its repercussions on the social structure of the town. Most of the work was in the hands of Civilians, not trained for the job and whose views on sanitation were largely based upon European ways of living. Except for such piece meal efforts, no town planning schemes as such on any comprehensive scale, were contemplated or undertaken in India, almost till the end of the 19th century.

The building of New Delhi, the new Capital of India, on modern town planning principles, was however an outstanding achievement of the British Regime in India in the first decade of 20th century. The Capital group of Buildings, consisting of Government house, the Secretariat buildings the Council Hall etc. distinguished for their monumental architecture and beauty, both

individual and collective, dominates the new capital, to the exclusion of every thing else; so the new capital, with the pre-dominance of the official element in its civil life, was more a planning and designing of an Administrative centre at the highest Government level than planning and designing a new town as such. This however, does not minimise its importance, as a great work of art, symbolic of the glorious success of a supreme effort made by the British Government in this country, which was then a part of the British Empire.

✓ The real beginning of town planning in India however dates from 1915 i. e. the visit of the sociologist town planner, Pettrick Geddes to whom a reference is made earlier. A civic survey and conservative surgery were his two important innovations. By conservative surgery, he meant a policy of minimum destruction of properties (that too of kutchha and dilapidated structures) and conservation of all substantial buildings in the preparation of Improvement schemes. He deprecated the old policy of sweeping clearances (Major operation) and advised minor surgery to remove only the diseased part (of the town) This mode of planning was a challenge to the idols of the British officialdom. But unfortunately for India, the reports made by

him on eighteen Indian cities remained on paper., but there is no doubt that Geddes was the first man who brought a new outlook and a scientific approach to the town planning practice in India, in the British Regime.

A plan prepared by Geddes, for a town in South India is reproduced here to illustrate the principles advocated by him. (Figs 1 & 2). The year 1915 is also important from the point of Indian town planning legislation. The idea of planning the use of the land, first received statutory recognition in the country, in the Town planning enactment of 1915. This Act enabled the Local Authorities to prepare Schemes for lands, ripe for development or likely to be used for building purposes. The Schemes undertaken under the Act, were however limited in scope, their main object being to secure proper sanitary conditions and common amenities, in the suburban areas. By this Act, it was however recognised that the land owner wanting to develop his land, had other responsibilities, than mere compliance with Public Health and Building Regulations. Many Municipalities or towns, took advantage of the Act and a number of town planning Schemes were undertaken but they did not go beyond partially meeting the immediate housing needs of these towns that

too, of the upper middle classes, but in the absence of any comprehensive scheme for re-planning the town as a whole, the conditions in the towns almost remained the same till India's attainment of Freedom, with its attendant partition.

TOWN PLANNING IN FREE INDIA.

The partition of the country, created altogether a new problem, for rehabilitating the influx of displaced persons, from west Punjab and East Pakistan. The solution of the problem lay in layout of new colonies near existing towns or new town-ships on modern town planning principles. Naturally, the importance of town planning received wider recognition both by Government and Public and so there was a large demand for town planners all over the country. Chandigarh, the new capital of Punjab, is the greatest of the many state enterprises, undertaken to rehabilitate the victims of Partition.

NEED OF URBAN PLANNING IN INDIA.

A comparison of the figures of vital statistics of India with England, reveals the following state of affairs. The average death rate in India is 25 per 1000 as against 12 in England. The infant mortality in an Indian city is as

high as 200 to 300 per 1000 as against 67 in England. The average Indian lives about 30 years as against 53, the average life of an Englishman. These figures are obviously an index of the lower vitality and lower standard of living and also unsatisfactory working conditions prevailing in this country.

India though predominantly rural, has about 40 millions of Urban dwellers. Most of them are concentrated in comparatively congested centres, notably the great commercial ports of Bombay, Madras, and Calcutta, where we find, all the typical evils of the Western Metropolis, only magnified, referred to earlier. An outstanding problem, with which almost all our big cities are faced today, is the clearance of slums, where the living conditions are almost intolerable. There are about 140 slums in Bombay, accommodating nearly half the city's population. Approximately 25 p.c. of Calcutta's population lives in slum bustees, occupying nearly 1/8th of the city's living space. In Kanpur, 60 p. c. of the population, lives in kutcha houses, situated in slum areas. In Delhi and Ahmedabad, 20 p.c. of the population, lives in slums. The slums are not only a menace to Public Health but a disgrace to both the dwellers and the Authorities, who allowed

them to grow. The official figures quoted below, would throw sufficient light on the housing conditions of Bombay, which is one of the largest and apparently finest cities in the world though with worst housing records. Out of 32 lacks of population living in Bombay and its suburbs, about 17 lacks (53 p. c.) live in one room tenements, about 5 lacks (16 p. c.) in two room tenements, about three lacks (10 p. c.) in three room tenements. A lucky lot of 1 lack (3 p. c.) live rather comfortably, in 4 or more roomed flats or bungalows, while an unfortunate lot of about 6 lacks (18 p. c.) are homeless and live actually on foot-paths. This is why Bombay is dubbed as a city without 'soul' and its beauty only skin-deep. The problem of clearing these slums and rehousing all the displaced persons is simply colossal. It has been estimated that about 2 million new tenements, will have to be constructed to meet the requirements of low income families living in large Industrial centres of this country. The obvious solution of this great problem is decentralisation of Industries and with it, the industrial population. This means preparation of new layouts on modern town planning principles, in suburbs or new satellite towns; in other words, housing and town planning must go hand in hand. This ultimately leads to the urgent

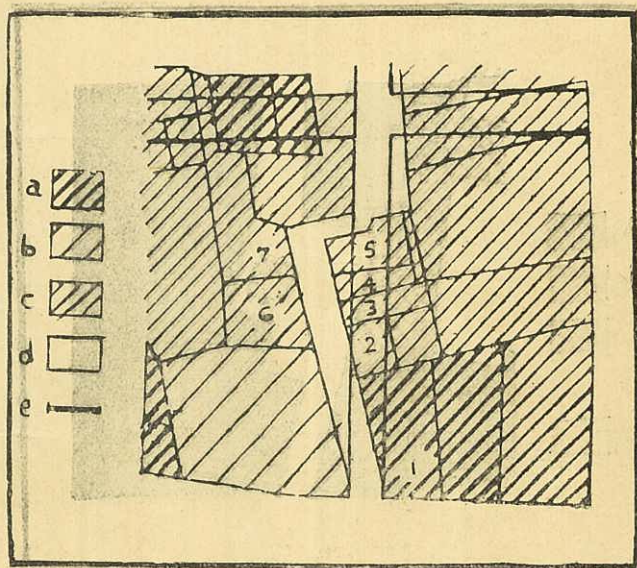


Fig. 1—Original proposal of Municipal Council to improve an old quarter, in a South Indian Town, by driving straight road.

(a) Pucca private houses to be acquired, (b) houses not to be acquired, (c) Kutchha private houses, (d) Municipal lanes, (e) boundary of proposed road.

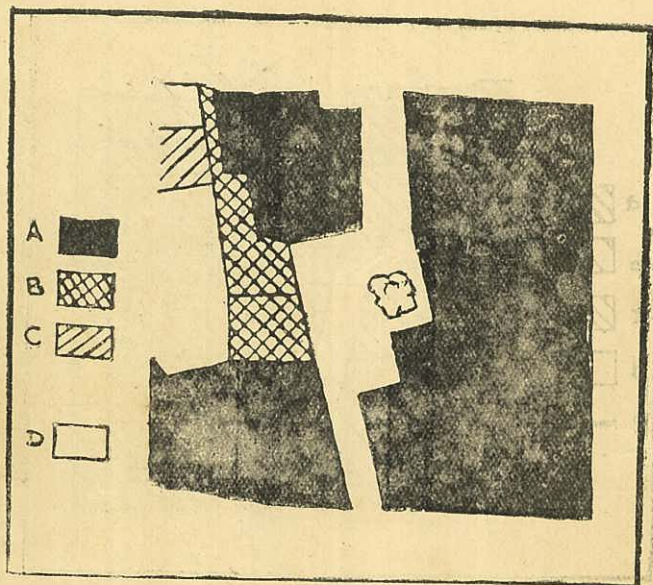


Fig. 2—Proposal of Sir Petric Geddes, to improve the area (applying the principles of conservative surgery.)

(A) Houses, (B) new house sites, (C) Kutch buildings,
(D) Open spaces and municipal lands.

need of preparing a Master plan for every city, of commercial and industrial importance, on the basis of a comprehensive civic Survey. Bombay has already given a lead in this direction by publishing in 1948 a Draft Master Plan for Greater Bombay. Poona and Nagpur have already followed in Bombay's footsteps. This chapter on town planning in India would not be complete without a brief reference to the bold experiment in town planning and town design that is being done in Chandigarh, the new Capital of post-partition Punjab. A team of most distinguished Architects and town planners from America France and England, have been brought together, for the first time, to prepare a 'Master Plan' of this new Capital. Chandigarh is perhaps the only town in India, that has been planned and is being built, entirely from the beginning or scratch. In fact, it marks the dawn of a new era, in the Town planning practice of this country.

The traditional pattern consists of —————
 (i) a central core called town centre, containing the principal shopping centre, civic group and business zones. (ii) Suburbs of houses of

CHAPTER IV

Elements of City Plan

All the individual objects, that we see in an urban scene, are elements in the city plan. The objects may be Buildings, Roads, Residential houses, Public Buildings, Parks, Factories or their ancillaries but all of them require sites suitable for their proper functioning. So a great deal of town planning is concerned with site planning i. e. judicious distribution of the available land among its various claimants. Broadly speaking, the land falls in two main divisions, (i) Open lands and (ii) Built-up lands. Under open lands, come roads and permanent open space reserved for recreation such as gardens, parks, playgrounds etc. Under built up lands, come all areas used for buildings for various purposes. The chief types, with which a city plan is usually concerned, are Industrial buildings, Residential buildings, Schools, Shops, Offices, Warehouses, Public and Semi-public buildings, and places of Assembly.

The traditional town pattern consists of (i) a central core called town centre, containing the principal shopping centre, civic group and business zones, (ii) Suburbs of houses of

all variety each with its own neighbourhood centre, consisting of small shops and social services, (iii) Areas of Industries, some of which are associated with the town centre and some with the Railways, (iv) A pattern of main roads and open spaces which run between the built-up areas and connect them with each other and the region.

In short the elements of a city plan may be classified into following heads and sub-heads:—

(i) COMMUNICATIONS:—

- (a) Roadways, which include transport facilities, such as bus stand etc.
- (b) Railways, which include passenger and freight stations etc.
- (c) Airways, which include air ports etc.
- (d) Waterways which include rivers, nalas, ports, harbours etc.

(ii) OPEN AREAS:—

- (a) Open spaces, permanently reserved for recreation, such as parks, gardens, play grounds etc.
- (b) Open lands, reserved for purposes other than recreation viz., cremation grounds, grave yards, burial places etc.

(c) Derelict and waste lands, not suitable for any construction or cultivation, such as trenching grounds; refuge depots etc.

(iii) BUILT-UP AREAS, FOR VARIOUS USES:—

- (a) Public and semi-public buildings.
- (b) Residential Buildings.
- (c) Shops, markets; business, and trade premises.
- (d) Industries.

(iv) ESSENTIAL PUBLIC SERVICES:—

- (a) Water supply.
- (b) Drainage.
- (c) Electricity.
- (d) Telephone.
- (e) Gas service.

(v) PUBLIC AMENITIES:—

Under public amenities, come a number of items, which are required to be provided in a town, at appropriate places for effective service. As they are too numerous, to be described in details, it is proposed to give only a list of the most important of them, which are not referred to elsewhere.

- (a) Post offices, Police stations.
- (b) Dhobi ghat and open spaces for cloth drying.
- (c) Petrol pumps.
- (d) Fire brigade stations, Octroi nakas, slaughter houses etc.
- (e) Trenching grounds, refuse depots etc.
- (f) Dairies, Gaoli-settlements etc.

No definite standards of use allocation and distribution can be taken as a guide for all cities. But a rough approximation of reasonable percentages to be allowed in a predominantly residential town as recommended by the Town planning Authorities in England and elsewhere, is as given below:—

(a) PRIVATE OWNED LAND. Percentage of Areas

Residential			
(i)	Single family houses	...	36.50
(ii)	Two family houses	...	5.00
(iii)	Flats	...	15.50
(iv)	Business, shopping etc.	...	3.00

Total60.00

(b) PUBLIC OPEN SPACES:—

(i) Streets	20.00
(ii) Parks	...	20.00

Total..... 40.00

This is shown in fig No 3.

It would be seen from Fig No. 3 that as much as 40 per cent area, in the town, should be open. Among the built up areas, the residential areas which form the major portion (47 p. c.) have a vital relation to human welfare. This is why planning of residential areas, should receive the most careful consideration. The rest 3 p.c. is for business, shopping and other public amenities.

All these elements will be discussed in details in the next chapter.

(50-1)

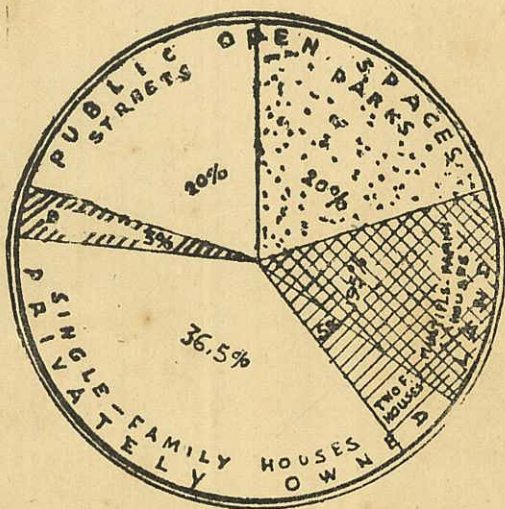


Fig. 3—PERCENTAGE DISTRIBUTION OF LAND IN A TOWN FOR VARIOUS USES.

Note:—that 40% area is open, 20% for parks and 20% for streets. The remaining 60% from the built up areas. Of this 47% is for houses (single, two family, and flats) and 3% for business, shopping and public amenities.

5778 .

CHAPTER V

Communication & Public Transport.

(1) IMPORTANCE OF COMMUNICATIONS AND TRANSPORT FACILITIES.

Facilities of communication are the basis of the existence of towns or cities. Improved methods of transport, are at the root of the modern phenomenon of rapid city growth and the success of the city depends on good means of communication than any other physical factor. The plan of the major roads, is usually determined by the broad zones, into which, the city is divided, while the system of the local or minor roads, determine the size and shape of housing blocks. That is why, the street plan, is regarded as the foundation of the town-plan.

(2) EVOLUTION OF THE TRANSPORT SYSTEM.

The various stages of the development of transport system may be briefly stated as below:—

- (i) 1st stage: transport on head-load and on animals like bullocks, horses, mules, camels, elephants etc.
- (ii) 2nd stage:—transport, by animal-driven vehicles viz.—Tongas, bullock carts, victorias, etc.

In both the above stages, the speed of travel and the capacity of carrying was limited.

- (iii) 3rd stage:—Local train service, on surface rail-roads.

With the invention of steam engine, in the 18th century, local trains driven by steam power, became an important means of mass transportation of goods and passengers, at fast speeds. The suburban development of the city, for several miles from its heart, has been made possible, mainly, by this form of service.

- (iv) 4th stage:—With the invention of electricity, and its use for locomotion, the trams came on the Road, as the cheapest form of rapid transport, for internal passenger traffic, on mass scale but the speed was comparatively slow and so more time was lost in the journey.

- (v) 5th stage:—With the invention of internal combustion engine, automobiles came on the road. In the initial stage, the motor cars were used as means of individual private transport but soon both buses and trucks became popular means of mass transportation of passengers and goods respectively.

- (vi) 6th stage:—Electric trains—As electric power came to be used for locomotion, electric

trains replaced trains, driven by steam engine and the new service by electric trains, became more efficient, on account of its high speed and flexibility.

(vii) 7th stage:—As the city become more and more congested and all the available open lands were fully used for extension of surface railways, tube railways, which ran underground, come into existence, along with their own stations underground, which were connected with the surface roads by mobile stair-cases, run by electricity. With its high speed, due to its being run by electric power and with no interference from the traffic on roads, this service became the most popular means of rapid transit, for suburban passenger traffic. It may be mentioned in this connection that the development of the road system, always lagged, behind the development of the transport system and the result was that eventually, the roads failed to fit in, with the requirements of the new means of transport and created a number of traffic problems, with which we are faced to-day.

(3) FUNCTIONS OF ROADS:—

The most common form of communications, with which, a town-planner is ordinarily

concerned, is roads, and their importance in the life of a town, can not be over-emphasized. Their main functions are:—

- (a) To provide channel for movement of people and goods.
- (b) To provide space, for laying essential public service lines such as water mains, sewers, telephone lines, cables, both overhead and underground.
- (c) To provide means of approach to every individual building.

Haulage and speed are the two important factors, which all roads, must cater to, satisfactorily.

(4) CLASSIFICATION OF ROADS.

Roads are given different names according to type of construction, jurisdiction, their dominant function etc. Names like murum roads, metalled roads, concrete or asphalt roads, indicate type of construction. Names like local roads, provincial and national roads or highways, suggest the jurisdictional authority. Names like ring roads, diagonal roads, radial and circular roads suggest their geometrical shape,

The most common types of functional roads, are defined below:--

- (a) An Avenue, is a road lined with shady trees.
- (b) Promenade is a pleasure walk or drive, usually with a water front on at-least one side.
- (c) Boulevards are public walks or streets lined with greenary or trees.
- (d) Park-ways:-Roads, whch pass, through park strips on both sides and are ear-marked for fast or through traffic are known as Park-ways.

The object of the park-strips is to make the roads, pleasing or attractive to through traffic. they are designed on the same lines as Arterial roads, which are described later. The park-ways form part of both street system and park system and thus play a dual role. The parkways are essentially a discovery of American town-planners and form the most important feature, of all modern American cities. They are usually laid, round the periphery of the busiest centre of the city. Through traffic, entering the city, along radial roads from various directions, is allowed to come up only upto these parkways and then, it is diverted along the parkway, so as to bye-pass

the busy centre and not penetrate through it. Any point in the busy centre is approached only by local roads, branching from the parkways at suitable points,

(5) ROAD SYSTEMS:—

The three systems that are very common are:—

(1) Rectangular or Grid System (2) Rectangular Combined with Radial (3) radial and circular roads, commonly known as 'Spider's Web' In the former, the roads, cross, one another, at right angles and divide the town into housing blocks, square or rectangular in shape. The grid system has both advantages and disadvantages:—

Advantages:—Convenient and economical for building construction. No wastage of land as in irregular housing blocks; allows maximum area to build upon; the system is most advantageous to private land-lords or private developers.

Disadvantages:—

(a) The system has no short cuts as in diagonal roads, which are necessary to give direct access, from any place to the central parts of the town,

where the shopping and trade centres, are usually located.

(b) In undulating country, the system proves expensive, as the roads do not conform to local contours

(c) The arrangement is most unsatisfactory, from traffic point of view, as segregation of traffic is not possible in such a system. Also each road has too many crossings or punctures and so there are more chances of road accidents.

(d) The system produces monotonous effects as the street picture is no where closed and the vistas are open, devoid of interest, and variety.

✓ **Combine Radial and Circular system:--**

The system represents the most natural method of organic growth in which a town or village grows in the form of concentric rings, round the focus or heart of the city, so that each growth or part, is as near as possible to the heart. In this system, the radial roads which are meant to give direct access to the heart or central parts of the town, are ear-marked for fast or through traffic and so these roads are usually

planned as Arterial roads. The circular roads act as intermediary, between the local roads and the through roads and their main task is to distribute the local traffic to various thorough-fares. So from traffic point of view, the system is, most, suitable. for economic expansion of the town, especially, where the towns have dominating central features like markets or public buildings etc.

Disadvantages:—Housing blocks and so also the plots are trapezoidal in shape and so they are not very economical, from constructional point of view as lot of space is wasted, due to irregular shapes of the plots.

In actual practice, a combination of both the systems has to be resorted to, according to topographical features and local requirements of each place.

✓ Rectangular Combined with Radial Roads—

The system has all advantages of rectangular Roads. The Radial roads provide for short cuts, and a direct approach road to the centre, which may be designed as an Arterial Road. This is its special advantage. (see Fig 4).

(6) TOWN PLANNING AND TRAFFIC PROBLEMS.

The system of roads, prevailing, in most of our towns, was originally meant, to meet the modest requirements of slow traffic, both pedestrian and animal-drawn, when the mechanically propelled vehicles, were yet to come, on our roads. The means of transport, were then comparatively simple, the speeds, also slow and so the question of road accidents, never arose, but the rapid development of the transport system and with it, the predominance of high speed motor traffic on the roads, during the last few decades, has now brought the question of road safety, to the forefront which is the essence of all our present day traffic problems. The chief trouble of our roads is that they are not functionally differentiated. The result is, that they are a jumble of through traffic, pedestrians, cycles tongas, rikshas and even animal traffic viz. cows, buffaloes, stray or other-wise. The main reason, why our roads are not safe for traffic, is that the slow and fast traffic, will never and can never safely mix.

The effect of the introduction of the automobiles, brought almost a revolution, in the transport system and accentuated, the traffic problems day by day but the road development

lagged far behind the development of the transport. The policy, that was generally followed in this connection, was to try to make the existing road system conform to new requirements. In urban areas, particularly, the policy of widening existing roads, to conform to traffic requirements, involved staggering expenditure, with only partial success; so a new technique and policy, of designing new roads, based on the principle of segregation of traffic, has been lately evolved and it is getting into more and more prominence, in modern town-planning practice. This aspect is dealt with in greater details, in the following paras.

(7) Principle of segregation of traffic. ✓

The inter-mixture of traffic, slow and fast, local and through, is at the root of the alarming number of road accidents that take place almost every day; so the remedy lies in their separation, either on altogether separate roads or on separate tracks, on the same road. There are several ways for separating or segregating the tracks on the same road, viz. (a) to keep the tracks on different levels; one higher and the other lower, (b) to keep them on the same level but to separate them, by a physical obstruction, such as raised island, footpaths, fencing,

or by colour bands, white or black. This is what is known as 'Place Segregation.'

Time segregation:—Where place segregation is not possible, time segregation has to be resorted to. According to this principle, the cross traffics at road junctions or crossing, are allowed to pass at different intervals, that is traffic in one direction is totally stopped or closed for a short interval, say a couple of minutes, while the cross traffic is on and vice versa. This is usually done by automatic signals by day time and by coloured lights at night, operated generally by mechanical device. This method of control is adopted in many of our large cities like Bombay. It may be noted here that such restrictive measures, are generally unpopular with the public, due to the loss of time involved there-in and so they should be used only where constructive measures are not workable.

(8) ROUND-ABOUTS, FLY-OVERS. CLOVER-LEAF.

The maximum number of accidents, occur at important road junctions and crossing; so the importance of their appropriate treatment, can not be too highly stressed. The two well known devices, which are commonly used to control traffic at the road crossings or junctions

go by the name of 'Roundabouts' and 'Fly-overs' are described below.

(a) **ROUND-ABOUT:**—They are devices meant for proper control of traffic at important road junctions. It consists in creating, in the centre of the junction of roads, a dead area called "a traffic island" round which all traffic is compelled to go clockwise in a gyratory manner, always keeping to left hand rule, so that the chances of collisions, due to short cuts or motion in opposite directions, are altogether eliminated or minimised. (Fig 5)

Requirements of a traffic island are:—

- (i) The island is generally circular or oval in shape. The size varies according to volume of traffic, minimum diameter to be 60 feet.
- (ii) Width of the carriage way round the island, to be slightly more than the average of the widths of the Crossing roads. All corners to be rounded off, for good visibility.
- (iii) For the guidance of the traffic, 'refugees' should be provided at the mouth of the approach roads.

(iv) The island should be fenced by about 9" concrete or stone curb painted black and white so that it may be prominent both by day and night. The curb must be properly lighted during night time.

(v) To give pleasing effect, the traffic island should have a fine lawn and some ornamental feature like a statue or fountain etc. but no tall trees; for good visibility, it is necessary that it is kept open as far as possible.

(b) FLY-OVERS.

This is another device for the control of traffic at important road junctions, particularly at the crossings of Arterial and local roads and is based upon the principle of 'place segregation' of traffic. At such crossings, the Arterial road used for fast moving traffic, is elevated above the general ground level about 20 feet at the centre and is provided with ramps on both sides. The local road carrying the slower traffic goes underneath, through an under-bridge. The two cross-traffic thus cross at different levels and so leave no chance for collision. The construction of fly-over is no doubt very costly but they are the most effective means of traffic control, at such junctions, where safety is the most important consideration.

(c) CLOVER-LEAF.

In this case, traffic is controlled by separating the grades. It combines in one both the fly-over and round about. (Fig 6)

(9) PARKING SPACES.

Use of the road, for parking purposes is a common feature of towns. Such a practice is very objectionable, especially in case of narrow roads, as it reduces the effective width of the roads and thereby causes congestion and overcrowding. It also causes inconvenience and hardships, to the shopkeepers in front of whose shops, the cars are parked. In fact, it is an abuse of the road, whose fundamental function, is transit of vehicles and not their storage, even temporary. The provision of open spaces, for temporary parking of cars, especially in the shopping and business areas, is therefore considered as an important duty of town planning or Local Authorities, now a-days.

There are two categories of parking spaces viz. (i) private parking spaces (ii) public parking spaces.

(i) Private parking spaces:— Formerly the provision of such parking spaces was left to

the discretion of the persons concerned but now a-days, the owners of big commercial establishments, cinema theatres etc, which attract a large number of visitors, are compelled under law, to make their own arrangements of park for their customers, in their own premises or in the basement floors of the buildings.

(ii) Public parking spaces: The various methods for providing public parking spaces are as given below:—

(a) Curb-parking—A strip of road of about 8 to 10 ft. wide is allowed to be used for parking on one or both sides of the roads for short lengths. The cars are parked lengthwise on these strips and the width of the road is correspondingly increased.

(b) Central strip parking:— In this method, the cars are parked in the central strip of the carriage way. This arrangement looks better and is also more convenient than on both sides.

(c) Side-road parking:—In this method the parking is allowed on the nearest side or cross roads, which are less important but not on the main roads.

✓ (d) Road off-set parking:—In this method, both the shop-line and the foot-path line are set back by about 20 feet, for about 100 to 200 feet length (for 10 to 20 cars). In this case, the parking space is clear of the roadways and the footpath and so there is no curtailment in the effective width of the roads. Therefore this is a better arrangement than the others referred to above.

✓ (d) Underground parking:—In this method the parking space is provided underground, in a vault, constructed just below the traffic islands at important road junctions. Suitable approach roads with ramps are provided for entry and exit. This method is however very costly and is suitable only where other arrangements are not practicable.

(10) REQUIREMENTS OF AN IDEAL ROAD SYSTEM.

The requirements of an ideal road system are:—(i) safety (ii) efficiency, (iii) beauty. An ideal system must satisfy all the three requirements. To satisfy the requirements of efficiency and safety, the principle of segregation of traffic, is strictly adhered to. According to this principle, the construction and the design of the roads is governed by their functional requirements. For this purpose, the roads

divided into two categories viz.. (i) Arterial and sub-arterial roads which are earmarked, for through traffic, where rapidity of transit is the main consideration (ii) local roads, carrying local or slow traffic, meant to provide approach to shops, houses, schools etc., where the speed of travel, is no consideration. This includes measures for appropriate treatment at important road junctions and crossings (viz Roundabout and fly-overs.)

To satisfy the aesthetic requirements of roads, every opportunity must be taken to introduce an element of beauty in it viz. clear and dustless road surfaces and foot-paths edged with curb stones and curb drains, plantation of trees and greenery along foot-paths and road islands, proper proportion between the width of roads and the height of buildings, ornamental lamp-posts preferably with underground cables, artistic treatment of traffic islands, graceful curves and beautiful vistas, are some of the modest requirements of road aesthetics.

WHEEL PATTERN:—By modern Town-planners, the wheel pattern is advocated as an appropriate system, for the main traffic arteries of big cities. The principle features of the wheel pattern are:— a broad high-way or park-way cir-

7 cumscribing the congested business centre, forms the hub of the wheel. Other high-ways, radiating towards the outer residential and industrial areas will form the spokes. More important of the spokes will continue beyond the city limits as the provincial or inter-city highways. Curved routes, spreading out from the hub, in ever-widening circles, at suitable distances, from the centre of the city to the suburbs, will complete the wheel.

(11) PLANNING OF ARTERIAL AND LOCAL ROADS.

The main Arterial Roads should be planned in as direct line as possible, but they need not be necessarily straight. Sharp curves and sudden links, however, should be avoided, and change in direction, should be accompanied by curves. In planning such roads, opportunities should be sought for creating squares, open spaces and appropriate sites for Public or quasi-Public buildings, which should be located at the focal points, in proper surroundings and suitable groupings.

The Arterial roads, should have no house frontages, no ribbon development, no loading or unloading allowed on their surface, no standing vehicles, no pedestrians, on the carriageway. They should have limited road-crossings

or junctions, which should invariably be controlled by roundabouts or fly-overs. All pedestrian traffic should cross these roads only through sub-ways or over-head bridges. These roads should be made as attractive as possible to invite through traffic, and encourage speed by minimizing all sources of traffic barriers. The width of the roads should be not less than 80 to 100 feet.

✓ **LOCAL ROADS:**—These roads are meant for giving approach to buildings, shops, offices, schools, etc. Limited number of connecting links, between local roads and through-roads are no doubt necessary, but it is essential to preserve the local roads, from invasion of through traffic. So they should not be too direct or too obvious, and should be un-inviting, to through traffic, by doing away with all short-cuts. These roads need not be straight, and they are laid along the contours of the land, with minimum, cutting and filling. The width should not be less than 20 to 30 ft. (Figs 7 & 8).

(12) Replanning of existing roads and measures for minimising road accidents.

The various methods that are followed in this behalf are given below:—

(i) Widening of roads which pass through built-up areas covered by valuable buildings is always a costly affair. In such cases driving of new roads as 'Bye-Passes' through open or less-valuable lands, would prove more economical. All through traffic, should be diverted along these new roads; this would go a long way, to relieve the existing roads of their present congestion. No ribbon development should be allowed on such 'Bye-Passes'

(ii) Where new roads are not possible, we must make the best of the available road space, by banishing all obstructions to traffic such as parking of cars, loading and unloading operations etc.

(iii) Where the conditions permit, the roads should be sufficiently widened, to provide dual carriage ways and footpaths, for right hand and left hand traffic, to ensure, effective segregation of opposite traffics. If possible, separate tracks should be provided for cyclists, animal driven vehicles etc., on the principle of place segregation.

(iv) Spacious Roundabouts, should be invariably provided, at all important road junctions and crossings. The approaches to the

roundabouts, should be prominently visible, by smooth curves.

(v) Where possible, Fly-overs should be constructed at important junctions of Arterial and Local roads, as this is the most effective means of segregating the cross-traffics. Special crossings should be provided, for pedestrian traffic, at suitable intervals, on the Arterial Roads, as in the case of Railway level crossings. No where else, they should be allowed to cross.

(vi) The owners of buildings of public resort, like cinema theatres etc., which attract a large number of private and public vehicles, should be forced under law, to make their own arrangements for parking, in their own premises.

(vii) Where constructive measures like those mentioned above, are not practicable, restrictive measures, enforced under powers, should be freely used, for controlling the traffic. In such cases, the method of traffic control, by automatic signals in accordance with the 'Time segregation principle', would be found to be very useful, particularly at the busiest road junctions and crossings.

(viii) Where a road is too narrow, to allow opposite streams of traffic with safety, the best

means of traffic control would be to convert such road into a one-way traffic route. In such a case, the traffic in the opposite direction, is diverted along the nearest parallel road, which is also converted into one way traffic route but in the opposite direction. The method is very useful where widening of the existing road, is either very costly or otherwise impracticable.

(ix) The other restrictive measures are, speed limit boards, road signals at appropriate places, strict enforcement of left-hand traffic rule. All of them, would prove useful, in their own way.

It may be stressed here that restrictive measures are unpopular as they involve lot of inconvenience, hard-ship and loss of time and so they should be used only, where constructive measures are not practicable.

(13) FIXING WIDTH OF ROADS.

The guiding principle in determining the width of roads is that the proposed width, should cope up, with the volume of each class of traffic (fast, medium and slow) expected on the road, at the peak hour. This has to be determined before-hand, by taking a traffic census, at important points of the roads. Generally a lane or width of 9 to 10 feet is consi-

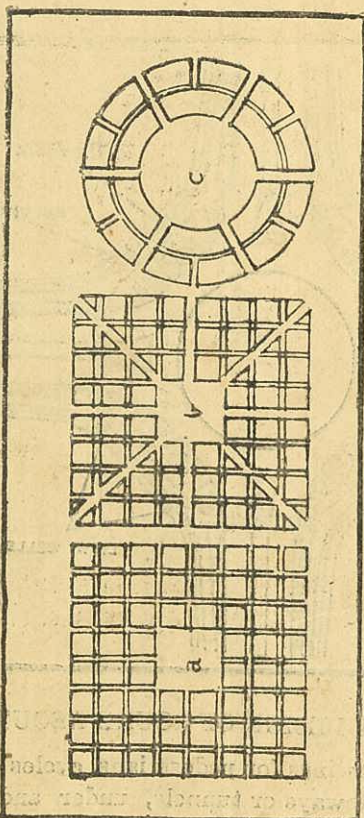


Fig 4—THREE COMMON TYPES OF TOWN PLAN.

Note:—The Types are given names in terms of road lay-out, viz—(a) Rectangular, (b) Rectangular combined with Radial (c) Radial combined with circular.

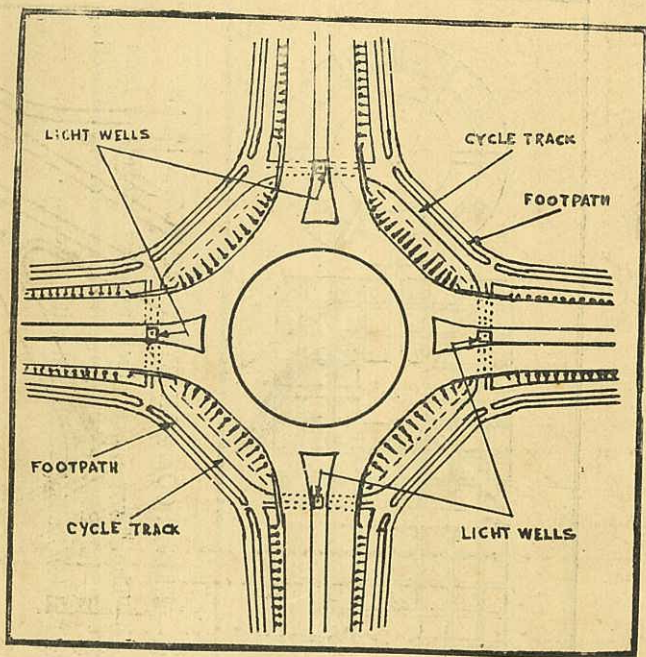


Fig. 5—TYPE DESIGN OF ROUND ABOUT.

Note:—Road crossings for pedestrians, cycles etc., are provided through subways or tunnels, under and across the road, lighted from above. Minimum diameter of the traffic island will be 60 ft.

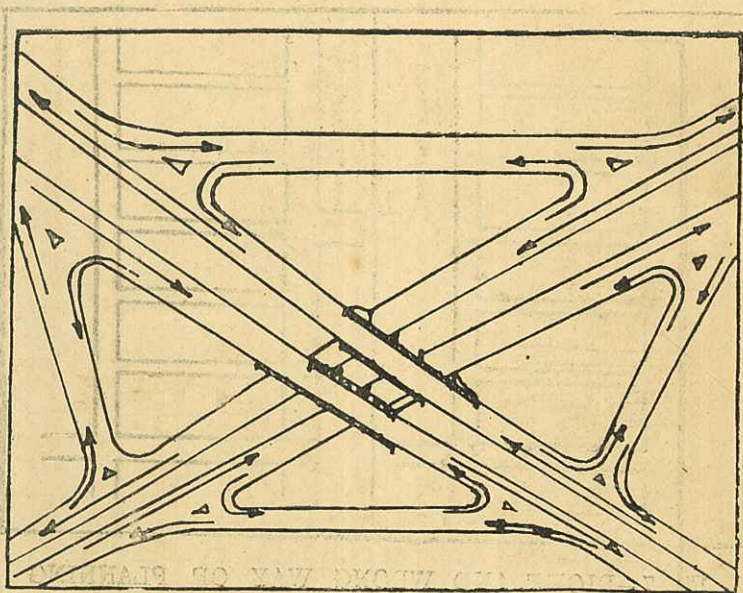


Fig 6—CLOVER-LEAF GRADE SEPERATOR.

Note:—It is an ideal form of road-safety device very common in U. S. A. It combines in one both a Fly-over and a Round-about. Only it requires a very large area. The arrows show the course of a car, avoiding collusions in every possible direction, for each type of crossing.

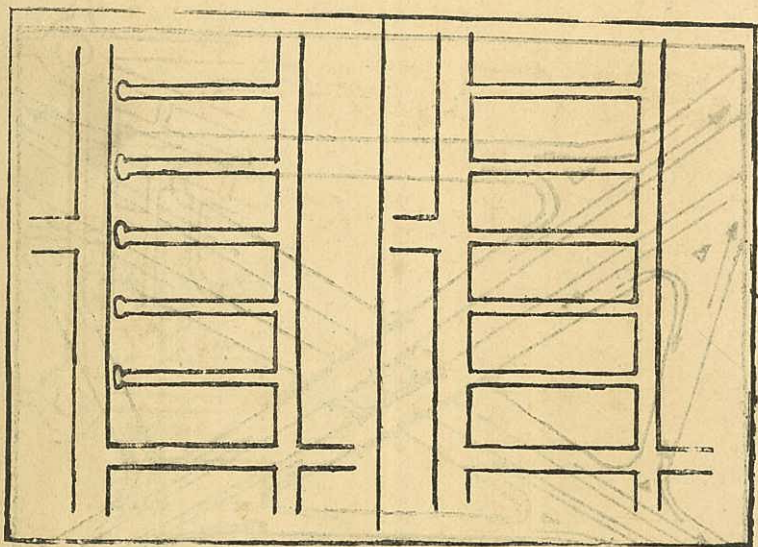


Fig. 7—RIGHT AND WRONG WAY OF PLANNING
ARTERIAL AND LOCAL ROADS.

(a) Shows correct lay out of arterial and local roads. The arterial road running north-south, has only one crossing or puncture. All the five local roads have dead ends, with approach from a separate service road to the east. The system has therefore greater safety.

(b) Wrong layout, Here the Arterial road has six crossings or punctures, at short intervals (say every 100 ft.) Hence more chances of accidents.

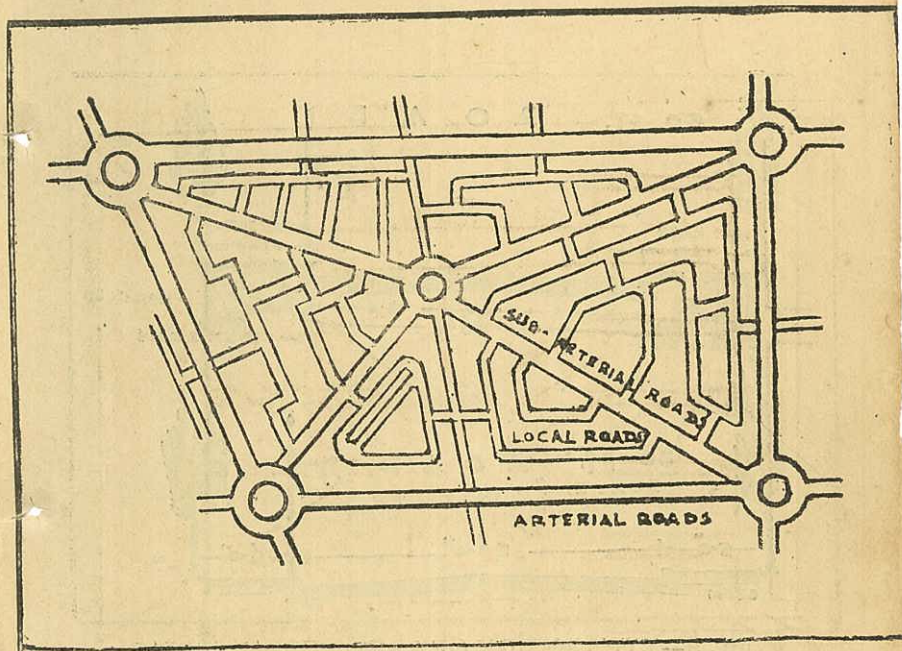


Fig. 8—CORRECT LAY-OUT OF ARTERIAL, SUB-ARTERIAL AND LOCAL ROADS FOR A RESIDENTIAL AREA.

Note:—Arterial roads will run straight, on the periphery of the unit, with very few crossings. Local roads however will never be straight: they are purposely made devious or zigzag, not to attract, through traffic. The local roads will connect the Arterial roads, through Sub-arterial roads only and never directly. Crossings of Local roads with Arterial roads will be provided with fly-overs.

(73-6)

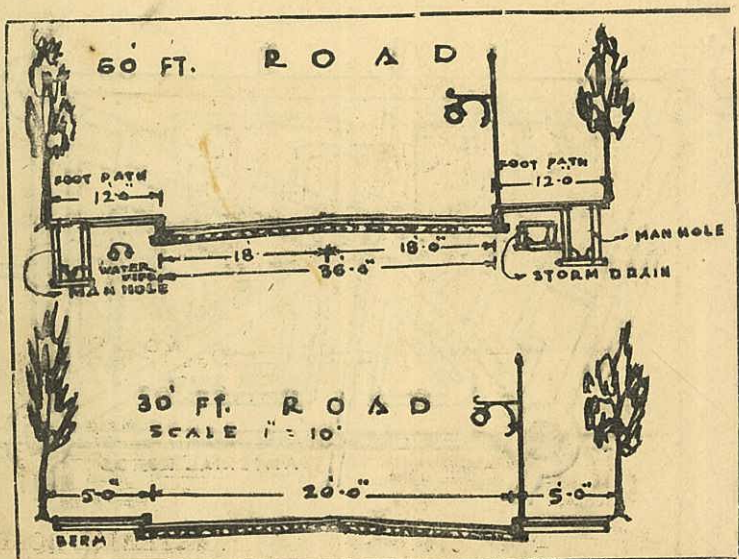


Fig. 9—TYPE DESIGN OF 60 FT. SUB ARTERIAL ROAD AND 30 FT. LOCAL ROAD.

- (a) The carriage way is 36 ft. (four lanes of traffic) with 12 ft. foot-path on each side. The Sewer Manhole and the storm drain are laid under the Foot-path on one side of the Road and the water pipe on the opposite side, (b) carriage way is only 20 ft. (two lanes of traffic), with 5 ft. berms on each side but no foot-path.

(73-7)

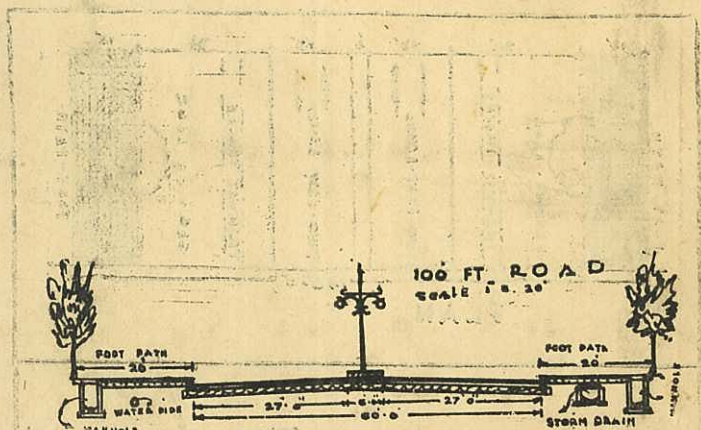


Fig. 10— TYPE DESIGN OF 100 FT. ARTERIAL ROAD.

Note—It has dual carriage-way each 27 ft. (three lanes of traffic separated by a 6 ft. island in the centre, with 20 ft. foot-path on each side—

THE II-TYPE DESIGN FOR THE ARTERIAL ROAD CARRYING TRAFFIC IN BOTH DIRECTIONS. It has dual carriage-way each 27 ft. (three lanes of traffic separated by a 6 ft. island in the centre, with 20 ft. foot-path on each side—

(73-8)

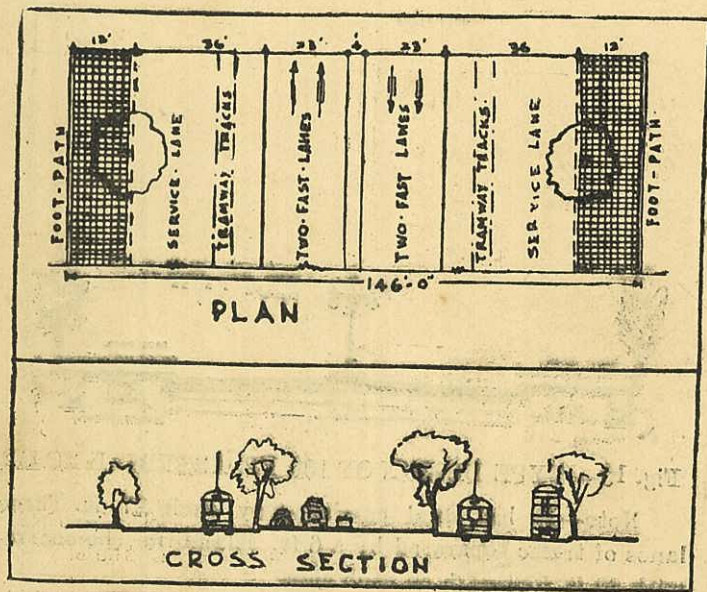


Fig 11—TYPE DESIGN FOR 146 FT. ARTERIAL ROAD CARRYING TRAMLINES PROPOSED IN GREATER BOMBAY MASTER-PLAN

Note:—It has dual carrying-ways, each consisting of 36 ft. strip (four lanes) for slow traffic and 23 ft. strip (two lanes) for fast traffic, separated, by a 4 ft. island, in the middle, with 12 ft. foot-paths on each side.

(73-7)

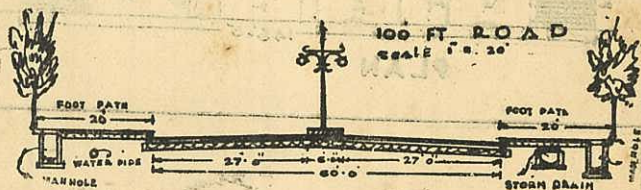


Fig. 10— TYPE DESIGN OF 100 FT. ARTERIAL ROAD.

Note—It has dual carriage-way each 27 ft. (three lanes of traffic separated by a 6 ft. island in the centre, with 20 ft. foot-path on each side—

FIG. 11—TYPE DESIGN FOR 100 FT. ARTERIAL ROAD CARRYING TRAFFIC THROUGH IN

CHHATRA BOMBAY MATHUR-PLAN
Note—It has dual carriage-way, each consisting of 30 ft. (two lanes) for slow traffic and 20 ft. (two lanes) for fast traffic, separated by a 10 ft. island in the middle, with 10 ft. foot-path on each side.

(73-8)

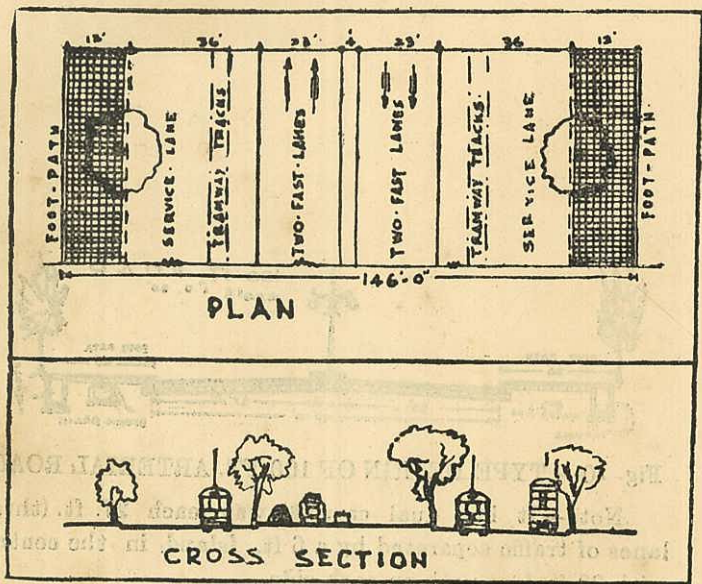


Fig. 11—TYPE DESIGN FOR 146 FT. ARTERIAL ROAD CARRYING TRAMLINES PROPOSED IN GREATER BOMBAY MASTER-PLAN

Note:—It has dual carrying-ways, each consisting of 36 ft. strip (four lanes) for slow traffic and 23 ft. strip (two lanes) for fast traffic. separated, by a 4 ft. island, in the middle, with 12 ft. foot-paths on each side.

dered to be adequate for a passing vehicle. So knowing the volume of traffic of each class, we can decide how many lanes of traffic are required to be provided for. This would give the total width of carriage-way. Add to it the width of the foot path on each side you get the total width of the road. The space available for vehicular traffic is called carriage-way. The carriage-way may be single or duel. In the duel carriage-way, the total space of the carriage-way is equally divided into two, separated by an island, to guard against road accidents, from vehicles coming in opposite directions.

Type cross-sections of 30 feet local Road, 60 feet sub-arterial Road and 100 feet. Arterial Road are shown in Figs 9, 10, 11, respectively. Fig 12 shows the type plan and cross-section of a 140 feet Road carrying tram lines either way proposed in the Master Plan for Greater Bombay.

The salient points in each fig are explained in the foot-notes.



CHAPTER VI

Park or Public Recreational System

(i) NECESSITY OF RECREATIONAL FACILITIES.

Recreation is now looked, as one of the important factors, which contribute to the health and well-being of a community. The primary purpose of providing recreational facilities in a community, is to increase the enjoyment of living. Such facilities contribute to health and morale, encourage relaxation, tend to direct the leisure activities of all age groups, into desirable channels, and thus enable people to live richer and more contented lives.

Bad housing conditions and lack of opportunities for desirable forms of recreation, are directly responsible for driving children into environments and activities, where the normal reactions are likely to involve them into delinquency and juvenile crime. So unless adequate provision is made for a variety of wholesome public recreations, the authorities responsible must be prepared to face and pay for the consequences of much ill-spent leisure.

Just as a city needs a street system, a school system, a drainage system, etc., so it needs a

comprehensive, well distributed and well developed system of parks, play-fields, sports-grounds, etc. A properly designed park or a public recreational system should therefore, form an important feature of any modern city plan.

(ii) FEATURES OF PUBLIC RECREATIONAL SYSTEM.

A satisfactory park or a public recreational system should have the following features:—

- (1) Provision for year round recreational activities for all ages, groups and all sections of the community.
- (2) Proper location with respect to living and working areas.
- (3) Easy accessibility, with safety.

The trend of modern planning in this behalf, is to plan, not for taking the people to the play-grounds or recreational centres but to take the play-grounds to the people themselves, so that they may be within easy reach of of every inhabitant, forming the community. Normally half a mile is found to be close to the limit of effective service of recreational and social facilities.

(iii) SELECTION OF SITES FOR PARKS, PLAY-FIELDS ETC.

There are a few principles laid down in the selection of lands for parks play-grounds, etc. Briefly stated they are:—

- (1) To acquire, easily accessible, small strips of land, in the city, which may cheaply be adapted, to serve as a local play-grounds, neighbourhood or recreational centres
- (2) To select such lands which are not well adapted topographically for streets, buildings, etc.
- (3) To acquire property for large parks in advance before the land-value increases as a result of any proposed development scheme.

In the case of thickly populated parts of a city, where the cost of acquiring new land is prohibitive on account of the high land-value, it may be possible to create suitable sites, at comparatively smaller cost for the purpose:—

- (i) By filling the old insanitary tanks, pools and ponds, etc , in the city.

- (ii) Clearing the slum areas in the city and then developing these into parks, play-grounds, etc.

This is usually done as a part of a slum clearance or anti-malarial scheme or any other general improvement scheme, to which the cost is debited.

(iv) VARIOUS FORMS OF RECREATIONAL AMENITIES. ✓

The facilities for out-door recreation, to be provided for, in a city may be considered under the following heads:—

- (1) Neighbourhood parks and gardens.
- (2) Play-grounds for children.
- (3) High School and College Play-grounds.
- (4) Public play fields and sports grounds.
- (5) Multipurpose stadium.
- (6) Sites for Akhadas, Vyamshalas and other Institutions catering to physical culture and indigenous games.
- (7) Swimming and Boating clubs.
- (8) Community parks and gardens, common to the whole city.
- (9) Afforestation.

(10) Park-ways.

(11) Common social, cultural and recreational centres.

By afforestation is meant cultivation of forest trees on the water supply basins or on hill tops, within easy reach of the city, to serve as places for picnics and occasional pleasure trips for the inhabitants of the city.

A few of the items in the above list and their requirements, which deserve special mention, are referred to, in brief below:—

(a) AKHADAS.

The Institution of Indian Akhadas, has been existing all over India, from time immemorable and all along, they have played an important role, in creating love for good physique, and imparting coaching in the art of body building, self-defence etc.

So far these Institutions were left to the care of our illiterate or less educated brothers, but now the educated class must come forward to take them into their own hands and put new life into them, by giving them, the required status and dignity.

(b) INSTITUTIONS CATERING TO PHYSICAL CULTURE AND INDIGENOUS GAMES.

The Indian games like Khokho require comparatively less space and are therefore very cheap, both in the initial and maintenance cost and provide equal opportunities, to foster, team spirit, sportsman-ship and fellow feeling, like foreign games like Cricket etc. It is therefore necessary to provide adequate number of sites, for them also, if such games are to be encouraged.

The demand of open spaces for institution, coming under the above categories, is comparatively very small, say about $\frac{1}{4}$ to 1 Acre, each, but the most important consideration is their even distribution and their distance from individual houses served by them. This distance should not ordinarily be more than $\frac{1}{4}$ mile.

(c) PARKS OR PLAY-GROUNDS FOR CHILDREN.

The main consideration in locating sites for parks or play-grounds for children is easy accessibility, with safety. Ordinarily boys or girls, should not be required to walk, more than $\frac{1}{4}$ mile, from their home and that, they should not be required to cross any Arterial road, on their way to the school. It is equally important

to equip such parks with modern types of sporting apparatus like Sea-saw, Merry-go-round etc. and make them as attractive as possible, for the children. The area required for each would be $\frac{1}{4}$ to 1 acre.

(d) GARDENS

The function of gardens is to provide in the city recreative open spaces, which are meant for evening rest and relaxation by all sections of the public.

The gardens are therefore made attractive, by planting all varieties of flower-beds, lawns, trees, bushes etc., which also have cooling effect on the air.

Botanical gardens, which provide all specimens of plant life, have got high educative value. Gardens which provide for all specimens of animal life are called zoos. They act as the reservoir of fresh air for the town, and are therefore called the 'lungs' of the town. So adequate provision of gardens is very necessary, to promote health and well-being of the town. The area required is about 4 acres per unit, for a neighbourhood garden. For a community garden common to the city, it will be very much bigger (10 to 20 acres).

(f) MULTIPURPOSE STADIUM,

A multipurpose Stadium, of modern design, to cater to the needs of all the games, both foreign and indigenous and also athletics and wrestling, is no less important need of large cities like Nagpur, particularly, capital cities of provinces.

The essential requirements of such sites, are:-

- (i) Good approach roads and facilities for rapid transport.
- (ii) Easy accessibility from all parts of the city and from the Railway station.
- (iii) Availability of enough land for present and future requirements (accommodation for at least 50,000 spectators.)
- (iv) A fairly even and elevated ground, with easily drainable soil, having low land-value.

The area required, will be at least 30 to 50 acres, allowing for all requirements, like parking spaces, pavillions, buildings for temporary accommodation of the visiting teams, canteens etc.

(g) COMMON SOCIAL, AND CULTURAL & RECREATIONAL CENTRES:—

Experience in other countries has proved that common social, cultural and recreational centres (each 5 to 10 acres in area) for people of all ages, class or profession, equipped with play-grounds, swimming pool, meeting hall and all other amenities, is the most economical way of providing for the social, cultural and recreational life of the city and it would be worth while to try to introduce this feature in the residential neighbourhoods of our towns also.

Before concluding this chapter, it need not be stressed that places like public parks, play-fields and other recreational amenities, are no more a luxury but a necessity of city life, just like water, schools etc., contributing as they do, to the pleasure and health of urban population, more than mere recreative feature. So, any City or Town plan, which lacks in adequate provision for recreational amenities, in accordance with the modern standard, must be considered as out-moded, incomplete and seriously deficient.

The value and importance attached to physical education and training, are aptly expressed in the famous saying of the great Duke of

Wellington that—"The battle of Waterloo, was won on the playing fields of Eton."

Now, with the advent of national independence, it is for our Popular Governments to view the question from a national outlook and see that recreation is made to play an important part in our educational curriculum, and all facilities and encouragements are given to institutions which are actively working in this field.

(h) STANDARD OF OPEN SPACES.

The standard prescribed on the basis of population by different Planning Authorities vary from 10 acres to 5 acres per 1000 population according to the local conditions etc. Out of this, at least 2 acres per 1000 will be for Neighbourhood open spaces. According to this standard, (2 acres for 1000 population), the distribution of open spaces for out-door recreational purpose would work out as below:—

Requirement of open spaces for a Residential Neighbourhood unit of 10,000 Population.

Description	No.	Acreage per unit	Total	Remark.
1. Parks and gardens	1	4	4 acres	within $\frac{1}{2}$ mile
2. Parks for Children	2	2	4 "	" $\frac{1}{4}$ "
3. Play-ground for High Schools	1	4	4 "	" $\frac{1}{2}$ "
4. A common Gymkhana for adults	1	4	4 "	" " "
5. Site for Akha- das, and other Institutions catering to physical culture and Indian games.	4	1	4 "	" " "

Total 20 acres

This is exclusive of open spaces for community Parks and Gardens etc. which are common for the whole city.

Fig 12 shows a Diagram showing an ideal Park system, for a Town, designed by Mr. G. L. Parkar. The circular parkways and wedges

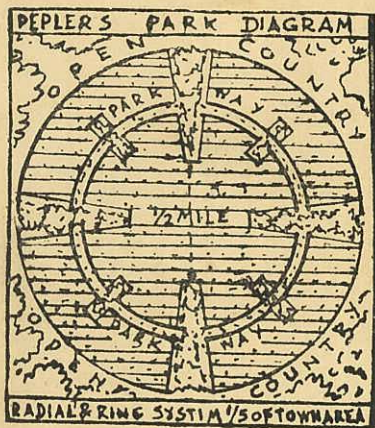


fig. 12—DIAGRAM SHOWING AN IDEAL PARK SYSTEM FOR A TOWN DESIGNED BY MR. G. L. PARKAR.

Note:—The circular parkways and wedges of park land go to form an inter-connected park system, which is particularly suited to a radial road plan.

of park land go to form are inter-connected Park system, particularly suited to a Radial Road Plan,

(e) BOATING AND SWIMMING CLUBS.

Full advantages should be taken of all existing tanks, lake, rivers and river bunds as they provide excellent facilities required for such clubs which, if properly equipped, are bound to provide healthy recreation to a large section of people, who may take a fancy for it.

CHAPTER VII

Sub-division of land.

(I) MAIN CLASSES OF LAND -SUBDIVISION.

Broadly speaking, city land from the point of view of land sub-division, may be divided into three classes, namely land for industrial use, land for retail and whole-sale business and shopping, and land for residential use.

The land for industrial use, varies so much with the different requirements of industries that it is not possible to set down any rules for its laying out, except those that apply to land planning, in general. Some industries may require one half to one acre plot, some five to ten acres and others may require as many as 100 acres. Retail business property also varies in its requirement of land but not to so great an extent, as property for industrial use. Except in the case of new cities, laid out in advance of settlement, city buildings occupy land that was originally laid out, for residential use. As a general rule, business has much less choice than industries. Normal business requirements are met by a plot say 40 ft. x 100 ft. The principal field of land division, which concerns at least half of all city

land, is residential property. This is why the location and planning of residential estates or areas require the most careful consideration.

In the planning of the town, the first task of the town planner, is to divide the town, into broad zones viz. industrial, commercial and residential etc. The main lines of inter-communications are then fixed and finally, the area defined by each zone, is sub-divided or laid out in terms of local streets, open spaces, building blocks and individual plots.

Efficient planning implies efficient land sub-division, with due regard to certain basic principles and a fair compromise between natural conditions and social, economic and aesthetic factors. The main objectives of an efficient sub-division, should be to secure the best economic use of the land, orderly spacing and grouping of buildings, convenient arrangement of streets, preservation of natural features and even distribution of open spaces.

(2) PRINCIPLES OF SUB-DIVISION.

(a) Every sub-division should be planned in blocks and plots, to suit topography and character of site, and also to suit types of buildings, appropriate to the locality. This means

that sizes and shapes of blocks, should not be determined with any pre-conceived theoretical or geometrical pattern.

(b) The planning should be done, with as much regard to Function as to natural conditions, social well being and true economy in the development and construction cost.

(c) Aesthetic purpose should be subordinate to social purpose and both must have regard to sound economy.

(d) For aesthetic effect, one should build as much with Trees and Greenary as with stone, brick and mortar; in other words, the design should express unity between topography and buildings.

(3) ELEMENTS OF SUB-DIVISION.

The main elements of sub-division are

(i) Plots (ii) Blocks.

(i) SIZES OF PLOTS.

The sizes of plots are determined by the sizes of buildings to be constructed and the open spaces that are required to be kept, all round the building, for light and ventilation, under the building regulations in force, in the

particular town. The sizes also vary with the use and character of the building. For example, the size of a plot for small industry or public institution like a school will be much bigger than that for residential use. Also the plot required for multi-family housing, like chawls or flats, will be much bigger than that for single family house. Rectangular shape, with the front side parallel to the main approach road, is considered to be the best, from point of building construction. The depth of the plot is usually $1\frac{1}{2}$ to 2 times the width, to allow for greater front and rear margins and also for privacy, light and ventilation.

(i) BUILDING BLOCK.

It represents the smallest sub-division of the land into plots usually of the same size, representing a very small but homogenous cross-section of a community. The shape of the block is determined by the shape of the enclosing road system (rectangular, square etc.) In a good sub-division, road crossing at acute angles should be avoided, as far as possible. The length of the block is determined by the exigencies of cross roads, while the depth will be equal to the depth of two plots. The placing of buildings around an open space, in the form of a

square, quadrangle, off traffic arteries, gives more privacy than what is obtained in detached houses, facing such arteries.

(4) PARKS AND INTERIOR OPEN SPACES.

The number and kinds of open spaces to be provided for, in a sub-division, depends upon the size of the sub-division, the density and the value of land. The open spaces, left in the middle of blocks are becoming more and more and more popular now-a-days. It is desirable that atleast 10 p. c. of the residential unit reserved as open spaces or parks.

(5) STREETS AND ALLEYS:—

The next important element, in land sub-division is the design of streets. According to their functions, streets are divided into three main categories namely Arterial, Sub-arterial and Local. The principles enunciated in the Chapter on Communications will apply to their design.

ALLEYS:—Alleys are narrow lanes or foot walks (say about 15 feet wide) which are primarily meant to serve the rear entrance to houses or buildings. The modern alley will be paved and kept clean and well lighted and is no

longer depository of filth and rubbish, which was the main objection against it. The trend of modern planning is towards making the houses, to back upon the main streets and face the alley side. Alleys are necessary, where the houses are planned in rows (of say 5 to 10 houses) on economic or aesthetic consideration. The alleys may be also used to advantage, for accommodating poles, wires and other public utilities.

(6) LOCATION OF CENTRES.

The location of centres and sub-centres is another important element in the scheme of sub-division. Such centres are usually the hubs of all public activities either for a restricted sub-division or a group of sub-divisions and should find a bold expression in the town plan. The centre may be a couple of shops, (of grocery, drugs etc) or a group of public and semi-public buildings that may be a pride not only of the city but of the whole region.

(7) TYPE DESIGNS FOR LAND SUB-DIVISION.

Type designs for land sub-division are shown in figs 13, 14, 15, 16, 17, 18 and 19, by way of illustration.

Fig 13:-

It shows rectangular building block having a combination of small and big plots. The bigger plots will have a service road at the back. The smaller plots will be back to back, without service road.

Fig 14:-

It shows four types of sub-division, suited for different shapes of the site (square, triangular, trapezoidal and semi-circular)

Fig 15, 16, 17:-

Fig 15 shows the contoured plan of an open site suitable for laying a new village or suburb. Figs 16 and 17 show the wrong way and the right way of land sub-division or planning of the site, respectively.

Fig 18:-

Nagpur Improvement Trust Layout for Ambazari Basti Precinct, Nagpur.

The layout is eminently suited for a site of a triangular shape. Note that the plots on the main road are bigger; those on the interior roads, meant for low income group are smaller. The bigger plots have a service road at the back

while smaller plots are back to back, without any service lane. The plots vary from 25 to 40 feet in width and 60 ft. to 110 feet in depth. On the smaller plot, the houses will be semi-detached. Only on bigger plots, the houses will be detached. The total area is 33 acres and the net density works to about 80 per acre.

Fig 19:—

Layout plan of Middle Class housing precinct (Shankar Nagar) Nagpur.

The layout is primarily meant for housing the low income people. The size of plots vary from 1500 sft. to 5000 sft. Note the plots reserved for primary school, park, and children's play ground etc. The interior roads are 30 ft. to 40 feet. The houses will be of semi-detached type, particularly on the small size plots. The total area is about 50 to 60 acres and the density works to 60 to 70 persons per acre.

This layout was prepared for the Pilot Housing Scheme undertaken by the Nagpur Improvement Trust for low income group. Under the Scheme, any person who has no house of his own and whose annual income does not exceed Rs. 6000 P. A. can get a house constructed for him through the Trust by

paying in cash, one fifth of the total cost the house (inclusive of the cost of the plot) and the balance, in equated instalments. The maximum amount that the Trust would advance on the house, was Rs. 8000.

Fig 19:-

LAYOUT plan of Middle Class housing project (Shankar Nagar) Nagpur

The layout is primarily meant for housing the low income people. The size of plots vary from 1500 sq. ft. to 5000 sq. ft. Note the plots reserved for primary school, park, and children's play ground etc. The interior roads are 30 ft. to 40 feet. The houses will be of semi-detached type, particularly on the small size plots. The total area is about 50 to 60 acres and the density works to 60 to 70 persons per acre.

This layout was prepared for the Third Housing Scheme undertaken by the Nagpur Improvement Trust for low income group. Under the Scheme, any person who has no house of his own and whose annual income does not exceed Rs. 6000 P. A. can get a house constructed for him through the Trust by

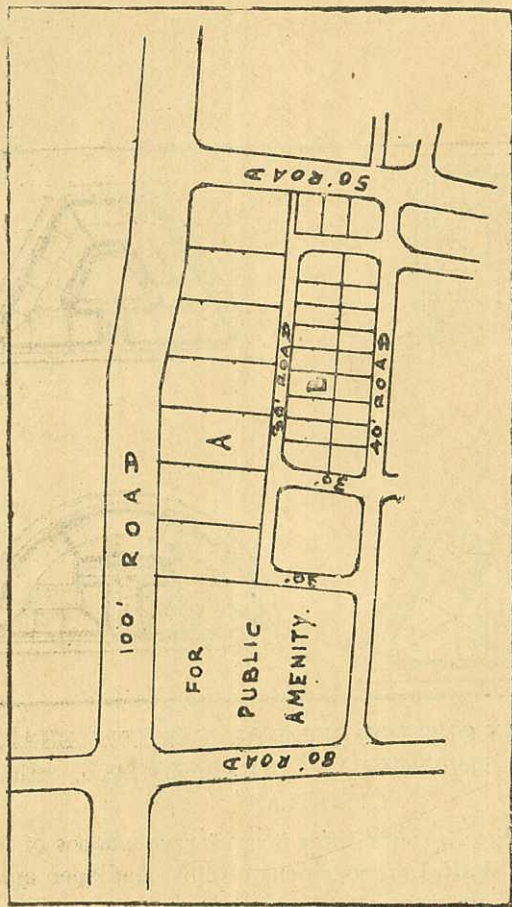


Fig. 13—RECTANGULAR LAY OUT WITH A COMBINATION OF BIG AND SMALL PLOTS.

Note.—A:—Big plots are provided with service road at the back. B:—Back to back plots, without service road.

(91-2)

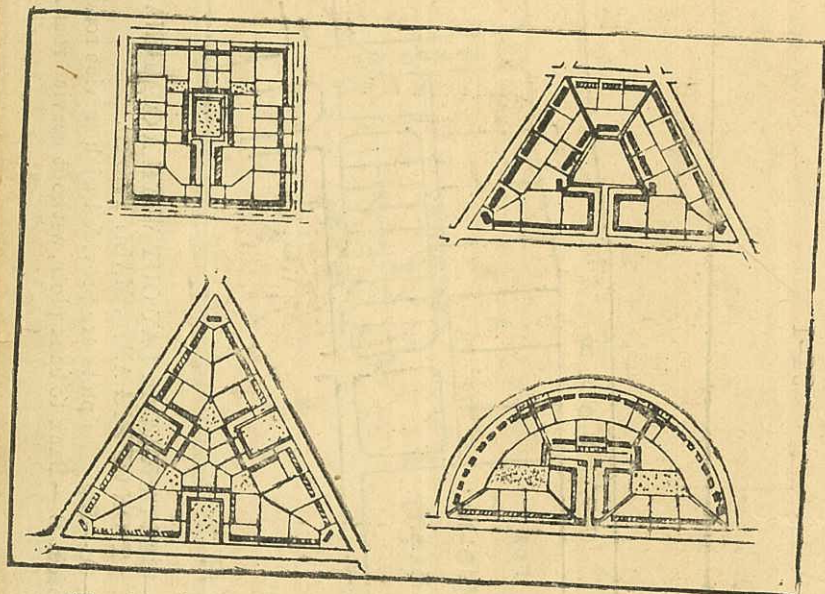


Fig. 14—LAY OUT FOR SITES OF VARIOUS SHAPES,
(SQUARE. TRIANGULAR, TRAPEZOIDAL, SEMI—
CIRCULAR.)

Note:—The Layouts differ for different shapes of sites
and it is the skillful arrangement of plots and open spaces
that makes them more attractive.

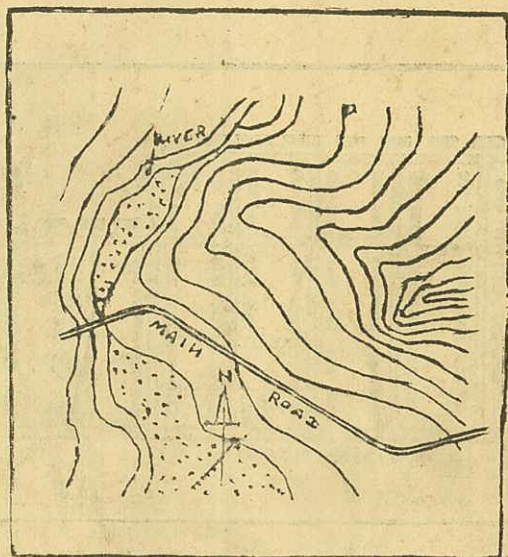


Fig. 15—CONTOUR PLAN OF SITE PROPOSED TO BE LAID FOR A NEW SUBURB OR VILAGE.

Note:—The curved lines running parallel to the course of the river are 'contour lines' drawn usually at 2 ft intervals and serve as a valuable guide for lay-out of roads and plots etc. this is why a contour-plan of a site is the pre-requisite of all physical planning.

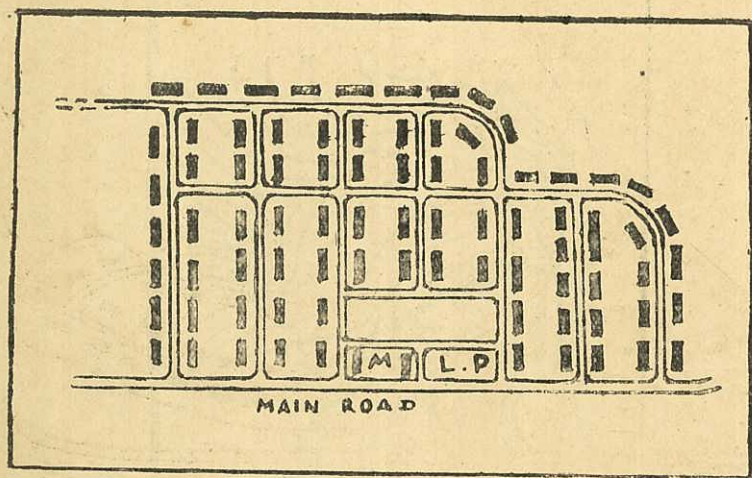


Fig. -16 WRONG WAY OF PLANNING THE AREA.

Note:—The interior roads are laid out arbitrarily, at right angle to the Main or Arterial road, without regard to contours. There are as many as seven intersections or punctures on the main road, at short intervals, which should have been only a few. No buffer space between the main road and the development. Market (M) and Lorry Park (L. P.) are sited directly on the main road, which is wrong.

(94-5)

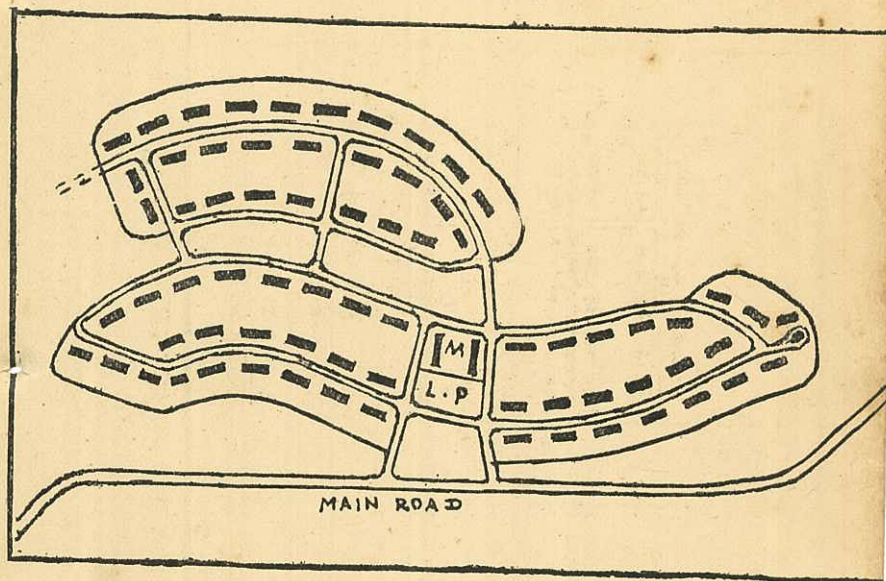


Fig. 17—RIGHT WAY OF PLANNING THE AREA.

Note:—The interior roads and plots are rightly, laid long contours, The Market (M) and the Lorry park (L. P.) are sited away from the main road, leaving enough buffer space in between. There are only two intersections or punctures on the main road, for entry and exit.

(94-6)

Fig. 18—NAGPUR IMPROVEMENT TRUST'S LAY OUT,
FOR AMBAZARI BAST PRECINCT, NAGPUR. (with
kind permission of Nagpur Improvement Trust.)

Note:—The Lay-out is made to fit in the triangular shape, of the site. The bigger plots are on the main road and smaller plots on interior roads, meant for low income group. The bigger plots have service road at the back, while smaller plots are back to back with no service lane, on the rear side. Note—Two corner plots are reserved for Public Amenities like schools etc. and three for small Parks.

(94-7)

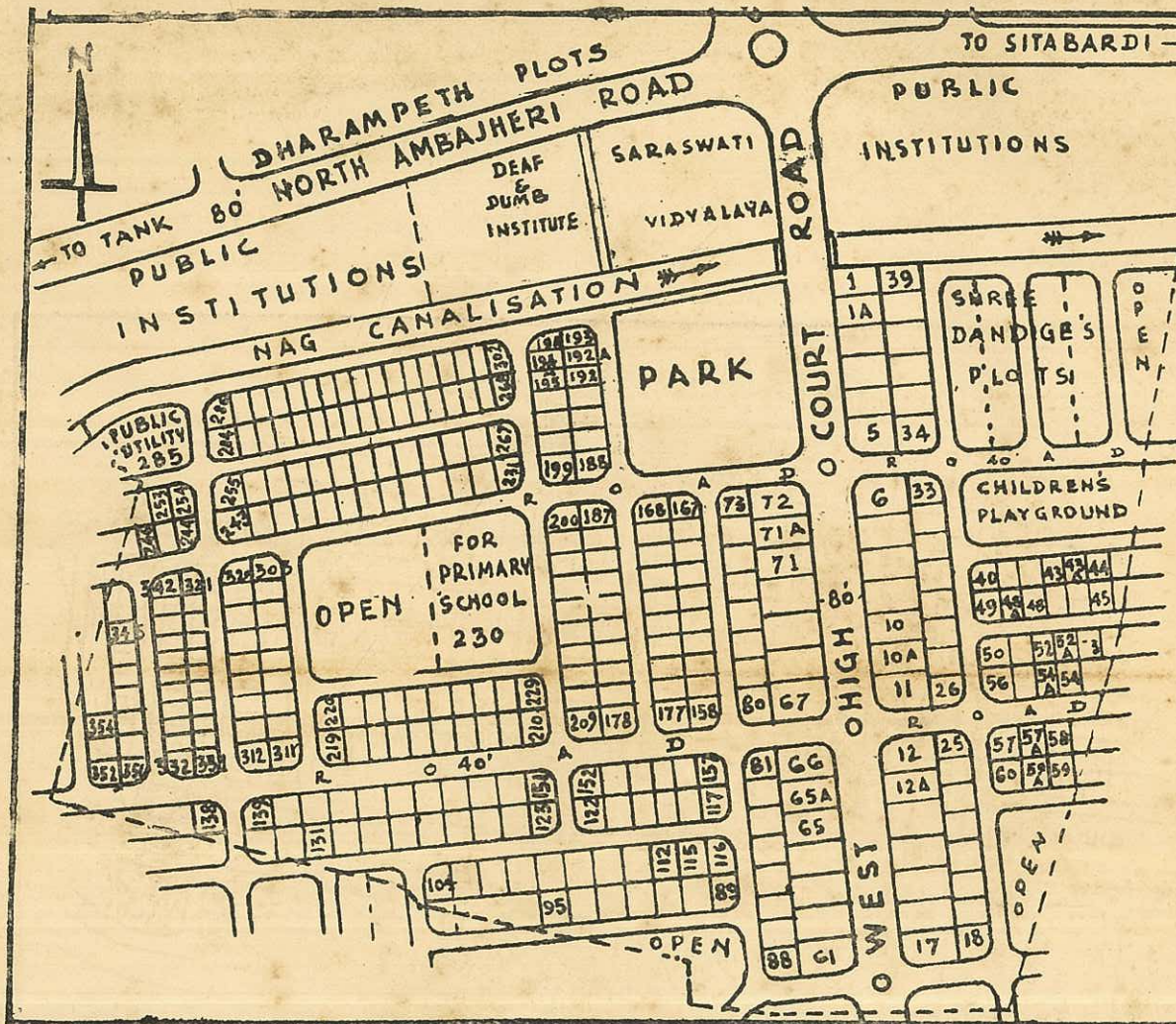


Fig. 19—LAY OUT FOR LOW INCOME HOUSING PRECINCT (SHANKAR NAGAR) NAGPUR.
(with kind permission of Nagpur Improvement Trust.)

Note:—A simple and elegant Lay-out for Low-group Housing, eminently suited for a site of rectangular shape. Public Amenities or Public Institutions, are on the main road and are shared in common, by the areas on both sides of the Nag-Nala. Sites for school, childrens play-ground, parks etc. are in the interior.

CHAPTER VIII

Town & Neigh Bourhood Centres and Public Buildings

(1) THE TOWN CENTRE.

The town centre is the chief administrative, business, entertainment and cultural centre of the town as a whole.

As an administrative centre, it is the meeting place of the city fathers and contains municipal offices, town halls etc., and a civic square, where public functions may be arranged.

As a business centre, it is the place where the townsman goes for shopping luxury or high cost goods, where a wider choice of articles is possible, than in the neighbourhood centre. The business centre is also the home of commercial and professional firms and wholesalers, who supply the shops, with the goods. As an entertainment and cultural centre, it is a place where the citizen goes to watch a place, see the latest films, to listen to serious music and to visit exhibitions of pictures, sculpture, paintings, etc.

The town centre is a meeting place for the population as a whole, for activities such as

announcement of election results, celebrations of important anniversaries and must provide a main civic square, a town hall etc.

For the purpose of planning, it is usual to divide these various functions into three groups (i) Business or commercial group including shopping centre and wholesale ware houses, (ii) civic groups being the main administrative, cultural and social centre containing town hall and other public buildings. (iii) light industrial are, containing workshops and service trades. As a meeting place, for all sections of the community, the Town centre should be the busiest and most lively, in the town. It should give the greatest feeling of urbanity. Since it performs so many different functions and since the building requirements, to fulfill these functions are so diverse that it should provide the most picturesque environment in the town. Since it is the focus of town's life and is the place to which the visitor is first drawn, (he judges the town, from his first impression) its design should receive most careful consideration. It is, where the architects will have unlimited field for exercise of their professional skill.

In contrast to other parts of the town, it is today very rarely that a Town centre is built

from the beginning on an open site; so the task of the ordinary town planner is restricted to redesigning and extension of existing centres, which is more difficult than to work, on an open site.

The visual problem in the design or redesign of the town centre is to give it a definition. while it may not be desirable to make a sharp cleavage between the centre and the surrounding area, one should be made conscious of change in character, when passing from one to the other.

(2) NEIGHBOURHOOD CENTRE:--

In the planning of a city, all town services fall naturally under two heads, (i) General i. e. those serving the entire city (ii) Special or Local i. e. serving restricted neighbourhoods or districts and repeated in successive districts. This division is particularly important in the consideration of the group of public and semi-public activities, which make for cultural progress and civic welfare.

The neighbourhood centre is the group of buildings and grounds in which provisions is made for various recreational, educational & social functions of the particular districts or

Neighbour-hood units. It concerns the mental, moral and physical building of the people living in the unit. The amenities will be shared in common. The size of the district will be restricted to the maximum distance, people could conveniently go to take advantage of these amenities. (usually $\frac{1}{2}$ to $\frac{3}{4}$ mile).

(3) PUBLIC AND SEMI-PUBLIC BUILDINGS

Buildings are divided into three broad divisions viz. (a) Public Buildings (b) Semi-Public Buildings and (c) Private Buildings. Buildings which are exclusively for public purpose come under (a). Buildings like Cinema Theatres, which though private, are meant to serve public purpose, come under (b).

(i) IMPORTANCE OF PUBLIC BUILDINGS.

Public buildings play an important role, in the public life of a city and so their design and location must be such that they would impress every visitor to the town as regards their grandeur and architectural beauty and should be an object of pride for every citizen.

The Public Buildings are supposed to be, an index of the civilization and cultural attainments of the people of the country and region,

of which the city forms a part and they should be, what 'Acropolis' was to Athens or the 'Forum' to Rome. They have thus a national importance and that is why the best skill and talent of the country should be used in their construction and design.

For these reasons public buildings must be given a prominent place, in the city plan.

(ii) SELECTION OF SITES FOR PUBLIC BUILDINGS.

Considerations which influence the selection of sites for public buildings are as given below:-

(a) Ideal location is at the focus of main Roads so that they are easily accessible from all parts of the town.

(b) A site, occupying one or more sides of public square, is preferable to one, in the centre of the square. When it is so located, care should be taken to see that the square is given enclosed character and no roads should pierce through it.

(c) They should preferably be located on high ground so that they would dominate the whole surrounding and be visible even from long distance.

(d) The site should be sufficiently large to meet both the present and future needs such as open spaces for a garden, Parking of cars etc. and there should be no obstruction of any kind, to sun-light pure air, breeze etc

(e) Where some natural feature such as river, harbour or sea-shore is available, they should be located so as to face such natural features, which enhance their effect.

(f) They should have a calm and peaceful atmosphere, attractive surroundings, and beautiful approaches, lined with trees, bushes or greens and should not be too near busy or noisy streets.

(iii) GROUPING OF PUBLIC BUILDINGS.

However beautiful or impressive, a building may be individually, it does not make as much appeal as it would do, if it is grouped with a number of similar buildings. In fact, the effect of public buildings is lost, if they are scattered indiscriminately, throughout the town, while the same building if grouped with others, in harmonious surroundings, would make an attractive composition and produce most artistic results.

Buildings are generally grouped in the following categories and each group is located in one or more centres described below:—

- (i) ADMINISTRATIVE BUILDINGS:—Public offices, Secretariat buildings, Law courts etc. This group is known as 'Civic Centre'.
- (ii) EDUCATIONAL BUILDINGS:—Arts, Science and professional colleges, University buildings, Central libraries, Research institutions etc. This is called 'Educational Centre'.
- (iii) MEDICAL AND HEALTH INSTITUTIONS:—Hospitals, Nursing homes Child Welfare Centre etc. This is called 'Health Centre'.
- (iv) ART AND CULTURAL INSTITUTIONS:—Museums, Art Galleries, Musical Academies etc. This is known as 'Art and Cultural Centre'.
- (v) RECREATIONAL INSTITUTIONS:—Cinema, and Opera theatres, Music Halls etc. This is called 'Recreational Centre'.

(4) CIVIC CENTRE

The most important centre in the town is the Civic Centre as it is intimately connected

with the public life of the city. All administrative buildings and places of assembly like Town Hall etc., are therefore located in this centre. The most important of them should occupy the central position so as to dominate the whole group. The site, selected for the Civic Centre should contribute to attractive composition and should have very few or no bisecting streets, to interrupt the continuity of line and mass in the group. The design of the whole group must measure up, to high standard of Architectural excellence. In short, the civic centre is an index of the dignity of the city and should occupy a prominent position in the city plan.

CHAPTER IX

Plannig of Industrial Estates & Shopping Cum-Business Centres.

(I) PLANNING OF INDUSTRIAL ESTATE.

From an essentially agricultural country, India is slowly developing into an industrial country. some of its most important industries have grown only during the short span of the last ten years. She has abundant resources of raw materials; most of these raw materials were hitherto exported in return for finished manufactured goods from outside but they will be eventually, used in her own factories to be started sooner or later.

(i) PRIORITY FOR INDUSTRIES.

It is said that a Nation is in a healthier condition if there is work for all, but not enough houses than if there are houses for all, but not enough work. There is of-course no question, to choose between factories and houses; for both must be there but there is a case for giving top priority to industries. General prosperity of the city and full employment of its people depend to a large extent upon the industrial expansion

or development of the town; this is why, top priority is given to industries, in the town plan.

(2) CLASSIFICATION OF INDUSTRIES:-

It is usual to divide the town's industries into two types (i) Manufacturing industries (ii) Service industries. The former is concerned with manufacturing goods mainly to be consumed outside the town. The latter are in nature of service to the town, such as bakeries, printing presses, workshops, ware houses, flour mills etc.

The Service industries are most obviously placed in areas adjacent to shopping centres; the warehouses may be associated with the town centre. There are also what are called 'Noxious Industries' such as Candle works, soap works, tanning and 'Extractive industries' such as Brick works, lime kilns etc. The noxious industries have no place in the town and require special sites outside the town. The manufacturing industries fall into three categories, according to the size of the plant, their horse-power the number of workers and above all, the amount of nuisance caused by the industries, namely:

- (a) Light industries such as manufacture of Glass, Porcelain, Ice etc.
- (b) Medium industries such as Cotton mills, Oil mills, Rayons etc.
- (c) Heavy industries such as cement, steel and such other materials, as are required for a number of other industries.

In light industries, solid fuel is not generally used for processing but only electric motors say upto 10 H. P. per Motor, are used for driving machinery. Obviously, they can be placed any where on the periphery of the town as they are not rooted to a source of power, provided they do not cause any real nuisance.

The second and third group invariably give rise to nuisance and their place is outside the town on new industrial estates to be planned either in the Municipal district or outside the district in the Region. The location of heavy or key industries like steel, cement etc. is now recognised as a matter of National planning and National Industrial policy and will be guided by factors like availability of raw materials, cheap electric power, easy communications by rail, road and water etc., so any local or

regional plan for any industries, must properly fit in, with the National plan. The task of the ordinary town planner is therefore restricted to planning sites for light and medium industries.

SELECTION OF SITES FOR INDUSTRIES.

Considerations which govern the selection of sites for industries in general and large-scale industries in particular are summarised below:—

- (a) Good communications and transport facilities by road, rail, water, for import and export of raw materials and manufactured goods.
- (b) Availability of facilities for loading and unloading operations through railway spur or siding, particularly where the daily out-put is in waggon loads
- (c) Cheap sites, cheap power and availability of all public services such as water supply drainage telephone, public transport etc. at cheap rate.
- (d) The sites of manufacturing industries should be on the leeward side of the town so that foul gases or smoke would travel away from the town.

- (e) pool of labour, both skilled and unskilled, round about the site.

★(4) PLANNING OF INDUSTRIAL ESTATE:—

The modern conception of planning of an industrial estate is to provide the needs of industry, with a view to produce with the highest degree of efficiency or in other words, it means a well thought-out plan, for the co-ordination of the various activities and the process of manufacture, from the raw stage to the finished product, giving maximum output, with minimum waste in labour and materials. The broad needs of industry are a well planned factory building, with clear floor space, light, air, breeze and a clean and cheerful surrounding and atmosphere, where work is more a pleasure than task. The factories must have ample storage space, loading and unloading facilities and provision for the welfare of the workers, such as canteens, health centre, bus stand and even Creches for female workers.

The sites will vary in sizes according to the number of workers employed in the factory and the space required for the various processes. The exact size will have to be determined by the requirement of each industry. It may

vary from $\frac{1}{2}$ to 2 acres in the case of light industries and 5 to 10 acres, in case of medium size industries.

(5) GROUPING OF FACTORIES:—

There are many advantages from grouping of factories on a common industrial estate. It is uneconomic and unpracticable to provide all the amenities, social, medical, recreational, viz. canteens, schools play-grounds, health and recreational centres, for a single factory on an isolated site. But by grouping of factories, it would be possible to provide all the amenities most economically. Again, with the grouping of factories, ideas are exchanged and joint efforts are possible for sales organization, export arrangements etc. A group of industrialists is also in a better position to watch the common interests of the industries than an individual, working singly.

(6) INDUSTRIAL HOUSING.

The last but not least, is the importance of industrial housing, in large scale industrial projects, which are now expected to make their own arrangements for housing their workers, not far away from the factory sites. Lack of good housing, adversely affects the morale and

efficiency of the worker. It is therefore essential that more attention is paid by an industry, to its obligation to provide every worker, with a decent quarter for his family, within a walking distance, from the place of his work. It is only by improving the living and working conditions of the workers, that an industry could better their standard of living and thereby promote happier relations, between the employer and the employees, which is so essential for greater efficiency and increased production. The days of the factory in the town's slums are numbered and there is no doubt, that sooner or later, such factories will have to be decentralised and transplanted along with the industrial population, in new sites in the rural surroundings, which will be planned on modern town planning principles.

II. PLANNING OF SHOPPING CENTRE.

As a general rule, shopping or business has less choice than Industries and residences, in the selection of location. The locations of business are determined largely by the street and transportation system, by street width, grades and proximity to the existing business centres. The town's shopping facilities will take the form of a main shopping centre, which serves the

town, as a whole while subsidiary centres serve only the neighbourhoods. The latter in small town will only be a parade of few shops,

(1) CATEGORIES OF GOODS:—In an approach to the problem, it is better to begin with the goods themselves. They are divisible into three broad categories viz. (a) Essential day to day goods such as vegetables, fruits, groceries, toilet requisites, pan and tobacco, stationary etc. Obviously, these goods form the main trade of the neighbourhood centre, (b) Goods purchased at frequent or regular intervals, like Furniture, shoes, watches, cycles etc., (c) Luxury goods such as Jewellery, Radio, Cars, Perfumes and all kinds of expensive goods and articles, which are purchased on special occasions such as marriages etc.

(2) FORMS OF SHOPPING FACILITIES;— The various categories of articles are sold, through four forms of shopping facilities viz., (i) Market, (ii) Shopping streets, (iii) Departmental Store, and (iv) Shopping Precinct. All the four forms, may be found in the Town centre but the neighbourhood, exclusively looks to the shopping street, for shopping facilities.

(i) MARKET:— The market in its oldest form consists of a series of stalls or booths, arranged in rows, in open or some-times covered by a roof, around which the public can circulate. The market is essentially a place for cheap goods. The goods are arranged in stalls or even on the ground, which performs the function of display-window, counter, and the storage space. The Market succeeds, when the town is the focus of a large rural population especially when it has been established for years. The essential requirments of a market place is a flat unobstructed space, upon which the stalls can be set up, in the midst of trees surrounded by buildings. The trees define the space and give protection from wind. Where such open space is not available, the streets are used as market place especially for weekly market or bazar, but this should be discouraged as it results in congestion of streets, traffic jams and even serious accidents. (Fig 20)

Whole-Sale and Retail markets:—The market places are again divided into two categories viz. wholesale market and retail market. The chief function of the whole-sale market is to collect the articles of consumption in a convient central place, where retailers may compare quality

and make selection. The wholesale market deals with perishable articles of food such as vegetables, fruit etc. For efficient working, they should have very good communications, by rail, road or water and have ample space for moving and standing vehicles and must have good storage arrangements. The Vegetable and Fruit market is the most common type of retail market which is required to be provided for every town & its design & location should receive careful consideration.

SPECIAL TYPES OF MARKETS:—Again there are special types of markets (orange, cotton, grain, handloom etc., called after the name of the commodity) required by certain cities, which are important distributing centres, for particular types of agricultural or other produce, grown or produced in the surrounding districts. This is why Nagpur which is an important distributing centre for Oranges, Cotton, Grain and Hand-loom cloth, is in badly need of a special market for each of these commodities.

Lastly there are other categories of market places, the rag and the bone market, the cattle, fodder, fuel markets etc. The rag and bone market deals in second hand goods of all types such as old furniture, second hand

books, cycles, prams and all sorts of waste pieces and has made itself very popular in big commercial cities. So the market scheme of any city, would not be complete without it.

(ii) **SHOPPING STREET:**—The shopping streets, which developed through old market stalls, becoming permanent structures, is now the most popular form of shopping space. It consists of a street, bounded usually, on both sides by shops, which have show windows and entrance doors, at the outer edge of the pavement and storage space and good access, at the rear, facing a service road (Fig 21).

The requirements of shopping street may be summarised as below:—

- (a) A continuous window display, uninterrupted by other building uses.
- (b) Wide pavement for parading, in front of shop windows.
- (c) Easy pedestrian access, across street.
- (d) Facilities for private cars, both to pull up at the site of the pavement and to park within short distances of shop windows.
- (e) Access for service vehicles to the rear of the shop premises.

(iii) The departmental store which might be likened to shops of all kinds under one roof, has characteristics, both of the market and the shopping street. Different stores may specialize in different types of goods but the typical Departmental store, should sell every kind of goods, from pins to pianos and for every pocket. Such stores require a large population, to pay for their considerable overhead charges and establishment and are generally located in the heart of the heavily populated areas.

The requirements of a departmental store are a continuous window display, showcases, square or rectangular selling space, wide pavements and facilities for car parking and for loading and unloading of goods. The ideal site is an island with entrance and display on three or even four sides.

(iv) **THE SHOPPING PRECINCT:**—The shopping precinct is an open shopping space, which the shops are made to face and from which all wheeled vehicles are excluded. It has taken three forms (a) Alley not wide enough to convert into shopping street, (b) shopping streets; closed to wheeled vehicles and (c) precincts designed as such from the beginning, on the principle of precinctal planning, referred to, in

Chapter XI. The variety of goods and the way they are sold, are the same as in the shopping streets, except that the show window has no sales attraction, for passing vehicles. The precinctal form solves the motor-car—pedestrian conflict. Vehicular circulation for both private and service vehicles, is on the periphery of the precinct (Fig 22).

Since shopping (as distinct from going to one particular shop) is essentially a pedestrian activity. The precinct is in theory superior to shopping street. Compared with departmental store, the precinct has the advantage that it is less costly and there is competition between traders. The requirements of the shopping precinct are a paved rectangular open space surrounded by shops, having their display windows facing it. It has a combined service and access road, parallel to but outside the main shopping frontages, with service bays to the rear of the shop. Parking areas are located off the road, around the periphery of the site, and numerous pedestrian connections are provided between the car parks, road and the precinct.

(3) USE OF 'Upper Floors' OF SHOPS FOR OFFICES AND FLATS:—

An important question that arises in the construction of shop buildings in the town

centre, is about the best way of utilizing the space available on the upper floors.

The traditional form of the shop, in which there was direct communication between the shop premises and the accommodation above, is now seldom built. The shop is now designed as self-contained premises to be locked, when business is over; but since land values are relatively high in shopping centres, the accommodation available on the upper floor is necessarily utilized for constructing offices on the second floor and dwellings on upper floors, in the shape of flats. The characteristic environment of good shopping street is noise and bustle and that of dwellings and offices, peace and quiet. In theory therefore, neither dwellings nor offices should be placed over such buildings, because their different requirements will bring them into conflict. However, we have to face the practical problem of land values. The aesthetics of the town centre also dictate that the buildings should have at least three to four floors, if not more, to match with the width of the abutting road or street and the length of the building frontage. So to satisfy the varied requirements, the buildings in the shopping centre are necessarily designed as multi-purpose buildings, with shops

and make selection. The wholesale market deals with perishable articles of food such as vegetables, fruit etc. For efficient working, they should have very good communications, by rail, road or water and have ample space for moving and standing vehicles and must have good storage arrangements. The Vegetable and Fruit market is the most common type of retail market which is required to be provided for every town & its design & location should receive careful consideration.

SPECIAL TYPES OF MARKETS:—Again there are special types of markets (orange, cotton, grain, handloom etc., called after the name of the commodity) required by certain cities, which are important distributing centres, for particular types of agricultural or other produce, grown or produced in the surrounding districts. This is why Nagpur which is an important distributing centre for Oranges, Cotton, Grain and Hand-loom cloth, is in badly need of a special market for each of these commodities.

Lastly there are other categories of market places, the rag and the bone market, the cattle, fodder, fuel markets etc. The rag and bone market deals in second hand goods of all types such as old furniture, second hand

books, cycles, prams and all sorts of waste pieces and has made itself very popular in big commercial cities. So the market scheme of any city, would not be complete without it.

(ii) **SHOPPING STREET:**—The shopping streets, which developed through old market stalls, becoming permanent structures, is now the most popular form of shopping space. It consists of a street, bounded usually, on both sides by shops, which have show windows and entrance doors, at the outer edge of the pavement and storage space and good access, at the rear, facing a service road (Fig 21).

The requirements of shopping street may be summarised as below:—

- (a) A continuous window display, uninterrupted by other building uses.
- (b) Wide pavement for parading, in front of shop windows.
- (c) Easy pedestrian access, across street.
- (d) Facilities for private cars, both to pull up at the site of the pavement and to park within short distances of shop windows.
- (e) Access for service vehicles to the rear of the shop premises.

(iii) The departmental store which might be likened to shops of all kinds under one roof, has characteristics, both of the market and the shopping street. Different stores may specialize in different types of goods but the typical Departmental store, should sell every kind of goods, from pins to pianos and for every pocket. Such stores require a large population, to pay for their considerable overhead charges and establishment and are generally located in the heart of the heavily populated areas.

The requirements of a departmental store are a continuous window display, showcases, square or rectangular selling space, wide pavements and facilities for car parking and for loading and unloading of goods. The ideal site is an island with entrance and display on three or even four sides.

(iv) **THE SHOPPING PRECINCT:**—The shopping precinct is an open shopping space, which the shops are made to face and from which all wheeled vehicles are excluded. It has taken three forms (a) Alley not wide enough to convert into shopping street, (b) shopping streets; closed to wheeled vehicles and (c) precincts designed as such from the beginning, on the principle of precinctal planning, referred to, in

Chapter XI. The variety of goods and the way they are sold, are the same as in the shopping streets, except that the show window has no sales attraction, for passing vehicles. The precinctal form solves the motor-car—pedestrian conflict. Vehicular circulation for both private and service vehicles, is on the periphery of the precinct (Fig 22).

Since shopping (as distinct from going to one particular shop) is essentially a pedestrian activity. The precinct is in theory superior to shopping street. Compared with departmental store, the precinct has the advantage that it is less costly and there is competition between traders. The requirements of the shopping precinct are a paved rectangular open space surrounded by shops, having their display windows facing it. It has a combined service and access road, parallel to but outside the main shopping frontages, with service bays to the rear of the shop. Parking areas are located off the road, around the periphery of the site, and numerous pedestrian connections are provided between the car parks, road and the precinct.

(3) USE OF 'Upper Floors' OF SHOPS FOR OFFICES AND FLATS:—

An important question that arises in the construction of shop buildings in the town

centre, is about the best way of utilizing the space available on the upper floors.

The traditional form of the shop, in which there was direct communication between the shop premises and the accommodation above, is now seldom built. The shop is now designed as self-contained premises to be locked, when business is over; but since land values are relatively high in shopping centres, the accommodation available on the upper floor is necessarily utilized for constructing offices on the second floor and dwellings on upper floors, in the shape of flats. The characteristic environment of good shopping street is noise and bustle and that of dwellings and offices, peace and quiet. In theory therefore, neither dwellings nor offices should be placed over such buildings, because their different requirements will bring them into conflict. However, we have to face the practical problem of land values. The aesthetics of the town centre also dictate that the buildings should have at least three to four floors, if not more, to match with the width of the abutting road or street and the length of the building frontage. So to satisfy the varied requirements, the buildings in the shopping centre are necessarily designed as multi-purpose buildings, with shops

(117-1)

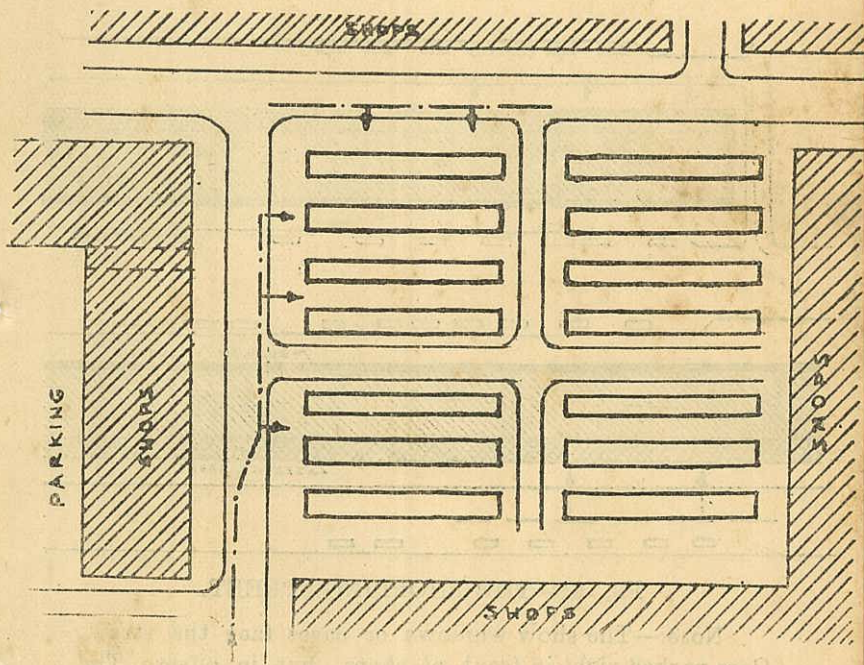


Fig. 20—THE MARKET.

Note:—The stalls arranged in open space enclosed by shops on all sides. Space provided for parking behind the shops. Cross roads serve as service roads.

(117-2)

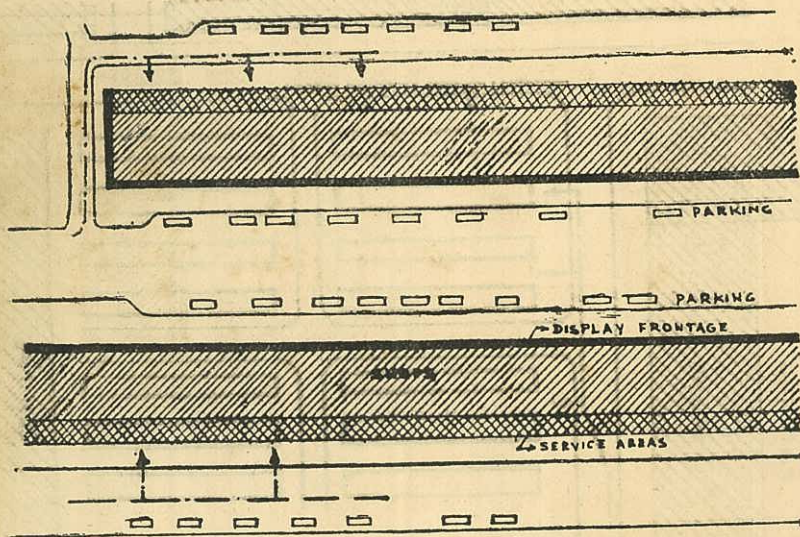


Fig. 21—THE SHOPPING STREET.

Note:—The show windows or cases face the street. Cars parked right in front of shops, but in offsets. The service road and service areas are at the back.

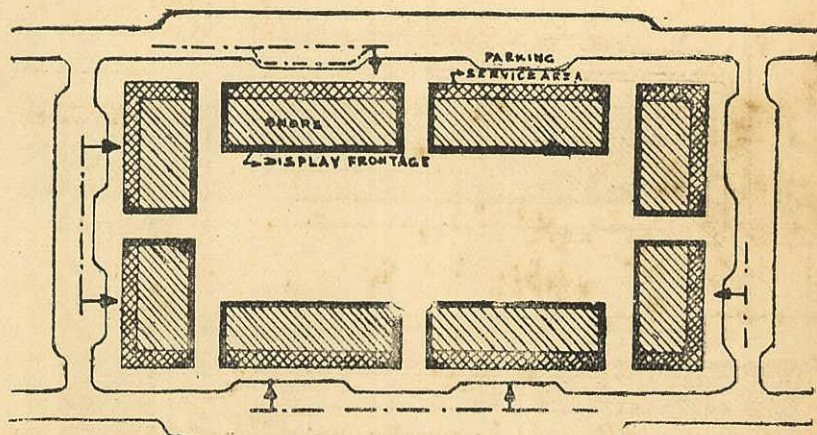


Fig. 22—SHOPPING PRECINCT.

Note:—The display windows face the open space from which wheel traffic is excluded. Parking provided on the main road, which faces the service areas. From parking areas, people have to walk to the shops.

on the ground floor, offices on the first floor and residential flats on the upper floors.

The design of such multi-purpose buildings open a vast field for architects for exercise of their professional skill or talent and they should be allowed full freedom, to evolve the best plan, which would satisfy the demands of both utility and beauty.

CHAPTER X HOUSING

Our most essential need next to food is shelter or roof over one's head. This certainly arose originally, out of the elementary need for protection against wind and rain. But Housing as now commonly understood, is no more a mere covered roof for every family or grouping together of individual dwellings but it is an integrated social unit., planned on the neighbourhood or community principle. The modern conception of housing, is that the house is primarily a biological institution, serving triple function of reproduction, nutrition and nurture.

Housing in this wider sense, is concerned with the layout and development of the residential areas, in such a manner, as to provide for people, hygienic dwellings, in pleasant and healthy surroundings with facilities for recreational and social activities.

(I) PRIORITY FOR HOUSING.

The residential areas form the major portion of the land, available in the town. As a rule, they have a greater value than all the

parts together and constitute the largest income of the city from the taxes. So the welfare of the city is dependent on the economic stability of its residential districts, apart from social consideration. So their location deserves a high priority in planning.

(2) REQUISITES OF RESIDENTIAL AREAS:—

An important requisite of residential area is a calm and peaceful atmosphere, with certain amount of privacy and immunity from smoke dust, and other nuisances. That is why, it is necessary that they are either sufficiently away from industrial and commercial zones or are segregated from them by parks or physical barriers, natural or artificial, like river, nalas, railways etc.

(3) NEIGHBOURHOOD PLANNING;—

All the Residential Areas are now planned on what is known as 'Neighbourhood Principle'. A neighbourhood may be defined as an area, in which people can reach within 10 to 15 minutes those institutions, which serve the local community and encourage them to foster a neighbourly social life, in their everyday dealings. The unit should be small enough, to facilitate acquaintance and neighbourly relations and large

enough to provide for diversity of population, representing all stratas of society.

The main principles of Neighbourhood Planning are given below:-

(i) The town is divided into self-contained communities each of 10,000 population. This will be further divided into smaller units, commonly known as neighbourhood units varying from 2000 to 5000 population, based on the capacity of a primary school.

(ii) To ensure social stability and balance, provision is made for a variety of houses and dwellings, to meet the needs of all sections of population or income groups, viz., cottages, flats, tenement buildings, etc.

(iii) Each community will have its community centre in which all facilities for social, cultural and recreational life of such community, will be provided in community buildings.

(iv) All conveniences required to meet the daily needs, such as schools, shops, dispensary, cinema, restaurants, etc., are provided on modest scale, in the

community centre which will be common to a number of neighbourhood units.

- (v) The neighbourhood will be served by a system of local roads, which will be connected to the main arterial roads on its periphery. In no case, the arterial road will be allowed to pierce through the residential areas and break its unity. (see fig 23)

(4) LAYOUT OF RESIDENTIAL AREAS.

Important principles of planning the residential areas are as given below:—

- (a) Houses should have varied and pleasing elevations.
- (b) They should be grouped so as to form a pleasing view, due attention being paid to the retention of such natural features as trees, pools, streams etc.
- (c) They should be so arranged as to secure adequate sunshine and fresh air to all habitable rooms.
- (d) Provisions should be made for houses for families of all sizes and should suit all income groups.

(e) The houses should be as varied as possible and consist of cottages, bungalows, semi-detached houses and flats. (see Figs 24, 25, 26)

Where an estate is likely to be of any considerable size, various communal services such as schools, libraries, shops, clinics etc., should be provided at suitable sites, reserved in advance.

(5) DENSITY.

The population per unit area, say per acre, is called density of population and is obtained by dividing the population by the area. The density is either gross or net.

The net residential density is the average density per acre, of the housing area, including only local roads.

The gross density is the average density of the whole area of the unit, including all open spaces, and all other lands under non-residential use, such as shops, schools and other public institutions.

As the density of population is generally an index of the normal or over-crowding conditions, it has a great bearing, on almost every

planning or replanning scheme. The Town planner has therefore to fix certain standards of net and gross densities for the various areas according to local conditions and they are then taken as basis, for planning new areas or replanning old areas.

For medium sized cities like Nagpur, Poona etc., we may adopt the following standards of density.

Description	Net density per Acre.
(1) For the inner ring with buildings restricted to two floors generally.	100 to 125
(2) For suburban ring	
(a) Basti Areas.	80
(b) Non-Basti Areas.	50 to 60

(6) TYPES OF LAYOUTS:—

The sub-division of the land into plots for the purpose of layout of the area, admits of variety in shapes and sizes and the town planner has to use his skill, in arriving at a pattern which would fit in with the topography of the land and also provide economically for the various needs of the community. The layout should have variety, convenience and economy in road cost.

A few of the well recognized types or patterns are described below:—

(i) Rectangular or Grid-iron pattern:—most uneconomic and unsuitable from the traffic point of view.

It has again two types (a) Back to back plots with approach road only in the front (b) Plots with approach roads in front and conservancy lane at the back. (See Fig 13 in chapter VII.)

The latter was considered to be more suitable for towns, served on the conservancy system but lot of land is wasted on conservancy lanes. It is also objectionable, from sanitary point of view as the conservancy lanes, eventually become dumping grounds of garbage and filth, which are indiscriminately thrown by the house owners.

(ii) CUL-DE-SAC:—(Fig 25)

In this type of estate development, the houses are arranged to face a dead road, branching from a main road, usually at right angles. A round-about is provided at the dead end, so that vehicles can take a turn and return by the same road. The advantages claimed are, privacy,

peaceful atmosphere, healthy surroundings, secluded from the din and bustle of the road traffic and considerable saving in road costs.

The main points to be considered in the design of cul-de-sac are:—

- (a) The Cul-de-sac should not be longer than about 200 feet as otherwise the object is defeated.
- (b) The end should have a terminal feature such as a block of houses on the central axis with a prominent Porch or Gable to make a focal point.
- (c) It should rise from entrance to end, which gives a better vista than if the fall was the other way.
- (d) The housing blocks should be nicely arranged with open front lawns to give air of spaciousness and an enclosed character, so as to form a homogeneous unit. The type of development is very popular now-a-days and is largely used in the lay-out of small estates.

(iii) SHOE-STRING DEVELOPMENT. (Fig 27)

This is an improved type of a cul-de-sack, with the difference that the plots are arranged

around a local road encircling an open park, in the centre.

The main features of this type are:—

- (1) The plots are arranged in groups, in the form of 'S' facing a park, which gives it an appearance of a 'shoe-string.'
- (2) Each group is woven alternately on the right and left hand side of the main road. with open spaces all round the four sides.
- (3) No plot will have direct approach from the main road. It will be approached only from the local road, encircling the central park

The type is very suitable in residential suburbs in open country. Healthy conditions, facilities for better social contacts, calm and quiet atmosphere, are some of the advantages.

(7) REILLY PLAN.

The idea of planning residential areas, on the neighbourhood unit principle, has been accepted by all town-planners. With a view, to secure full development of community life, and socially balanced society, various patterns of grouping of houses have been evolved, by town-planners in foreign countries. The 'Reilly

Plan' (known after the name of its Author,) is one of such solutions of community planning, which requires special mention. The basic principle of the plan, is to arrange the houses like the petals of the flower, in a group of about 250 (a 'Reilly unit' of about 1000 persons) around enclosed greens, with a community centre for three to four of such units. The main centre is located in the heart of ten of such units, making the total population of about 10000. The main centre provides for administrative buildings, local dispensary, clinics, shops etc. It is claimed that the 'Reilly plan' creates an ideal physical environment, in which spontaneous co-operation between neighbour and neighbour, is likely to develop and with it, a sense of community-spirit or, fellow-feeling, from the ordinary process of ones daily life.

(8) HOUSING AND TOWN-PLANNING.

Housing and Town-planning are closely linked.

The housing architect has to design accommodation to suit all types, the young, the old, the married, etc., and to combine durability, health, comfort, convenience and beauty, while the task of the town planner is to design a broad ground pattern, in which there is an

appropriate place for homes, schools, shopping, recreation and transport.

It should be however clearly borne in mind that housing as ordinarily understood is not town planning, though it is complimentary to it and must go side by side, through state or state aided agencies or through private enterprise.

(9) HOUSING PROBLEMS

Generally there are three aspects of the housing problem: —

- (i) Clearance of slums and rehousing the slum evictees.
- (ii) Shortage of housing.
- (iii) Unsatisfactory character of existing accommodation.

The 'crux' of the housing problem is to house each family, in accordance with the accepted minimum standards of health and comfort, at a rent bearing a reasonable proportion to the income, say 10 to 15 p. c. irrespective of the actual cost of the house. Two living rooms, each say 12'x10' with a kitchen and a bath room, with common or independent W. C, may be considered as the minimum accommodation

required for the poorest family, for Indian standards of living.

(10) TYPES OF HOUSING.

To economise in the housing cost per family, a number of housing types have come in the housing field in the past few decades; only a few of them are described in brief, below, with their advantages and disadvantages.

(i) DETACHED SINGLE FAMILY HOUSE:—As a completely independent unit, this has many social advantages over all other types—This is probably the best type for small towns or villages, where both land and building materials are cheaply available. The type is however not very economical.

(ii) SEMI-DETACHED HOUSE:—In this type, two houses have a common wall and there is a saving in the side margin and so in the plot size. Front elevation is considerably improved with the longer frontage especially if both the units are designed as one unit.

(iii) GROUP HOUSING:—There is saving in the cost of housing per family by about 5 to 10 percent. due to grouping. There is wide scope

for aesthetic effects, if all the units in the group are designed as one unit. (See Figs 28, 29).

(iv) CHAWL:-Multi-family housing unit, in which accomodation is provided in one or two room tenements, generally for poor or lower middle class. Here the common access is through Balconies or Galleries. Hence there is less privacy.

Bath rooms and W. C. are generally shared in common. Poor ventilation and light for all the rooms, except the end ones, over-crowding and congestion, are their normal feature.

(v) FLAT:-Multi-family housing unit for better class of people, in which accommodation is provided, in a suit of three to four rooms, with an independent kitchen, bath room and W. C., is the most popular type, in big cities. The cost of housing per unit of family is less than a detached one. An attractive lay-out for a group of Flats provided with beautiful approach roads and evenly distributed Parks and Greens is shown in Fig 30.

In built-up areas, where open land is both scarce and costly, resort is made to flat building, in order to increase building density, so as to

get as many dwelling units as possible, on the land available. There are mainly two types of flats (i) corridor type and (ii) Direct access type. In the first, the common access is through an inside corridor, and in the second, from a common entrance hall. The latter is considered to be the best type of flat. Flats are however not liked by people, who prefer individual houses, with gardens.

Multi-storied flats are popular in America and on the continent but not in England. The recent expert opinion also is anything but in favour of flats. Sir Mac Allister says in his introduction to "Homes, Towns and Country side" that it is not to our credit that the economic limits of suburban expansion having been reached, we fell back on tenement flats at high densities, in the centre of our cities, as a solution. This was not to solve the problem, It was a surrender to non-planning."

The strongest objection to flats is that they can never provide the healthy atmosphere and are most unsuitable for families having grown up children. Neither they are practicable nor desirable for the poor classes in India. But on economic grounds, they are inevitable in cities, where the prohibitive land values leave no other alternative.

(vi) **SKY SCRAPERS**:-Multi storied buildings to which a reference is made earlier in the second chapter under 'vertical Development' (See Fig 31).

(vii) **PREFABRICATED HOUSE**:-Prefabrication, which originated as an emergency measure for war conditions, has been now-a-days suggested, for permanent buildings, in order to economise in labour and materials and increase the speed of building by the partial substitutes of factory labour, technique of mass-production and the greater use of machines.

Mass-production of prefabricated houses would no doubt be welcome, as a measure of affording quick relief in respect of acute shortage of housing in the country. The cost of prefabricated houses depends upon the cost of materials like aluminium etc., of which several component parts of the house are built. The Cost of such a house is governed by the cost of these materials, which are more or less foreign and have to be imported. So, what promises to be cheap today, would not remain cheap in the near future. The life of a prefab is estimated as 10 to 15 years and it is doubtful whether it would prove to be cheaper in the long run. It is also a question, whether Prefabs, built on

western methods and standards, would be suitable to Indian climate and conditions of living. So, taking all these things into consideration, it is doubtful, how far they, would prove a success in this country and survive emergency period.

(11) SLUMS:—

The slum may be defined as a residential area, in which the housing is so deteriorated, so sub-standard or so unwholesome, as to be a menace to health, safety, morality or welfare of the occupants. An area of extreme poverty, of high rates of birth, infant mortality, illegitimacy, crime and death.

Slums usually spring up near a large industrial or commercial centre as the labour always like to be as near as possible to the place of work.

The main causes of the creation of slums are:—

- (a) Rapid industrialisation of cities without proper planning.
- (b) Intensive use of the available land, near the existing industries, to meet the growing housing demand.

- (c) Lag between the growth of population and construction of houses.
- (d) Poverty of the masses and inability to pay economic rent, due to low wages.
- (e) Low standard of education and living.
- (f) Inadequate power of municipalities to check their growth.

(12) SLUM CLEARANCE AND REHOUSING.

The problem of slum clearance is by far the most difficult problem, relating to city improvement.

it is closely allied, with housing or rehousing problems and so both of them must be tackled together.

The effect of slum life, crowded tenements, ill-ventilated and insanitary conditions, upon production or efficiency of the labour is immeasurable and so in the larger national interests, the slum clearance and rehousing scheme, must receive top priority, in the National Planning programme.

(13) DECENTRALISATION OF INDUSTRIES AND INDUSTRIAL POPULATION:—

The solution of the problem of slum clearance as advocated by modern town-planners

lies in the gradual decentralisation of the Industrial population, in new villages or townships, in rural surroundings planned on what is known as 'Garden city' principle, which has been already described in details.

(14) HOUSING AND THE STATE.

(i) HOUSING OF INDUSTRIAL LABOUR AND LOW INCOME GROUPS.

The most difficult problem in India and else-where, is to provide houses for the industrial labour and for other people with low income, who cannot afford to pay economic rents, much less to own a house. One of the solutions of the problems of housing industrial labour is to fasten the responsibility of housing such labour, on their employers or alternatly to compel the employers, to generously contribute to the housing schemes, to be undertaken by the State or Central Government. As regards the housing of other people with low income, the problem can be solved only with subsidy by such Government. This principle has been accepted by all civilized countries because the importance of adequate and better housing to to the health and efficiency of the community can not be calculated in rupees and annas, on a strict accounting basis. The effect of slum life,

lies in the gradual decentralisation of the Industrial population, in new villages or townships, in rural surroundings planned on what is known as 'Garden city' principle, which has been already described in details.

(14) HOUSING AND THE STATE.

(i) HOUSING OF INDUSTRIAL LABOUR AND LOW INCOME GROUPS.

The most difficult problem in India and else-where, is to provide houses for the industrial labour and for other people with low income, who cannot afford to pay economic rents, much less to own a house. One of the solutions of the problems of housing industrial labour is to fasten the responsibility of housing such labour, on their employers or alternatly to compel the employers, to generously contribute to the housing schemes, to be undertaken by the State or Central Government. As regards the housing of other people with low income, the problem can be solved only with subsidy by such Government. This principle has been accepted by all civilized countries because the importance of adequate and better housing to to the health and efficiency of the community can not be calculated in rupees and annas, on a strict accounting basis. The effect of slum life,

crowded tenements, upon the productive capacity of the people is immeasurable. The provision of housing the poor and the low income groups is therefore a State responsibility and should receive first priority in the National planning programme. The housing problem is mainly a financial problem. A beginning has already been made in Bombay to tackle the problem on a modest scale, through a Statutory Housing Board and other State Governments are also following in the foot-steps of Bombay.

(ii) HOUSE OWNERSHIP-AN APPROACH TO INDIAN HOUSING PROBLEM.

An Indian looks upon his ancestral house, with an amount of sanctity. With him, no 'Home' is no 'Status.' So the best way to solve the Indian housing problem is to approach it from this eastern conception viz encouragement of individual house ownership, whether through Housing cooperative Societies, State aided agencies or through other ways or means. One's, 'Own' house is not only an object of pride for its owner but it also creates an interest in such owner, for his town and its well-being. The house ownership

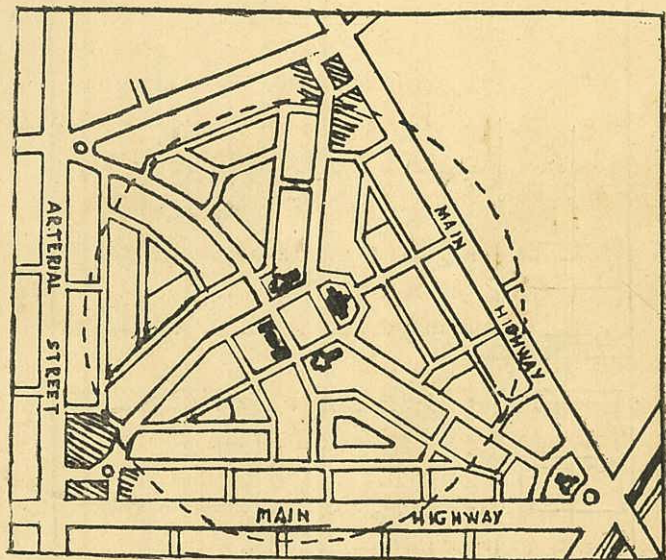


Fig. 23—DIAGRAM SHOWING NEIGHBOURHOOD PRINCIPLE.

Note:—Diameter of circle shown in dotted lines is $\frac{1}{2}$ mile (maximum walking distance of neighbourhood.) The school, the community centre are in the heart; shopping provided on periphery at traffic junctions, main high ways go on the periphery and not through the unit.

(137-2)

(1-181)

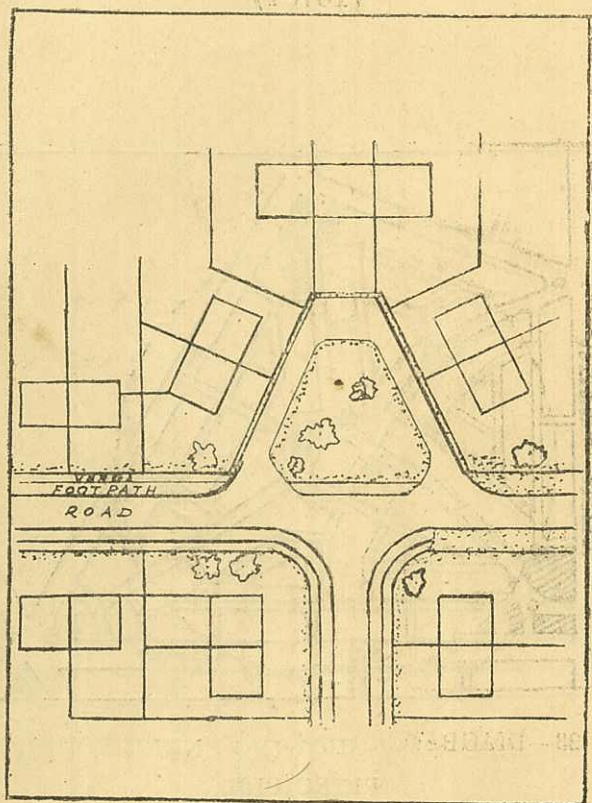


Fig. 24—AN ATTRACTIVE LAYOUT WITH A SHORT DETOUR OF BUILDING PLOTS AND BUILDING LINES.

A short detour of the building line round a park strip or green, introduced at intervals by the road edge, relieves monotony and makes the layout pleasing and picturesque.

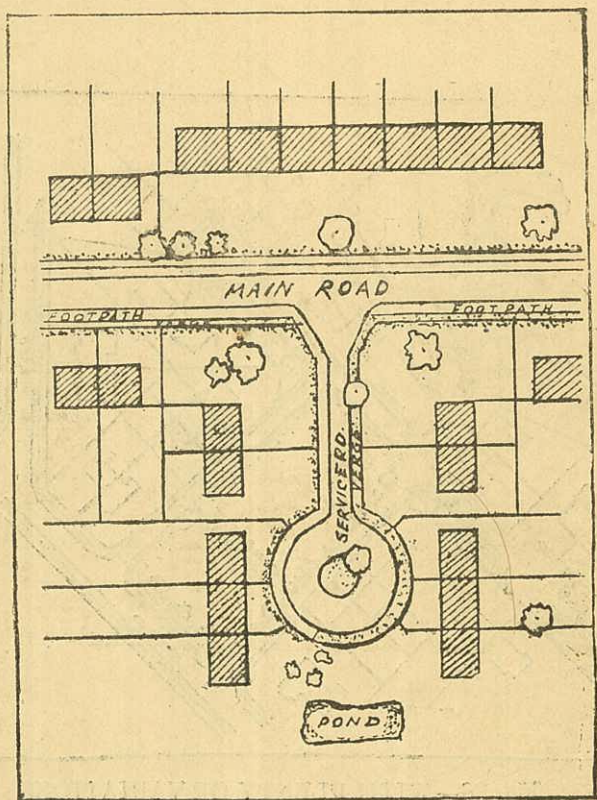


Fig. 25—CUL-DE-SACK

Houses face a dead road, branching from the main road. Note the round-about at the dead end for vehicles to take turn.

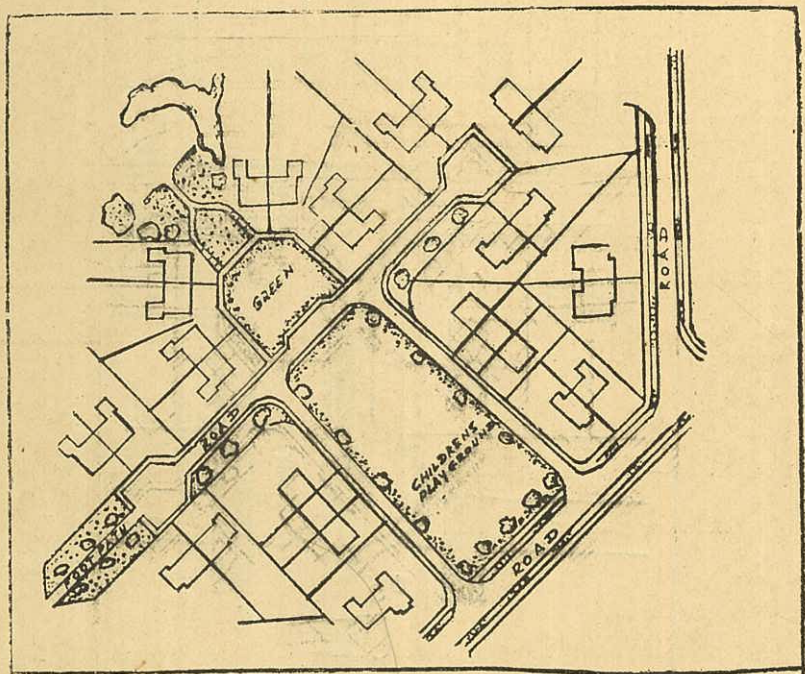


Fig. 26—WITH PLENTY OF VARIATIONS

Greater the variety in the layout, the more attractive it becomes. Note the grouping of buildings round the open spaces off the main road. A suitable design for a Neighbourhood centre.

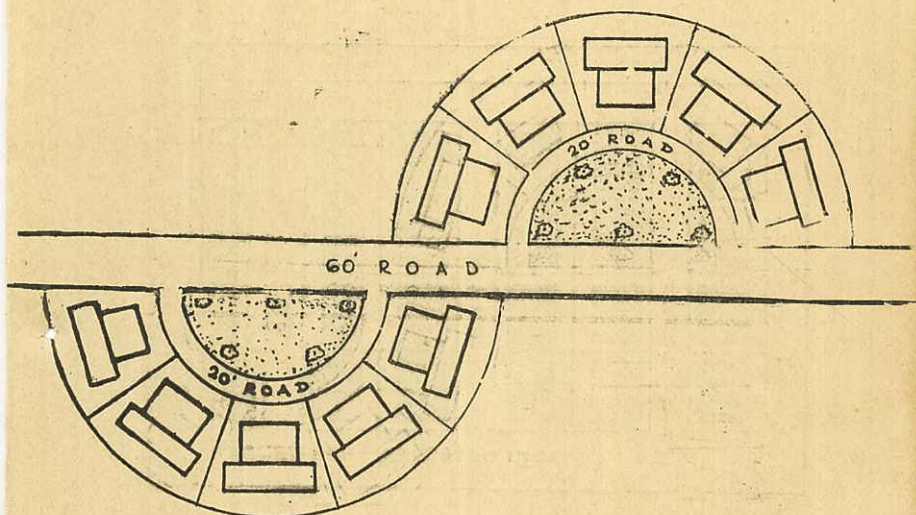


Fig. 27—SHOE STRING DEVELOPMENT

Note:—The layout is made to look like a shoe string, by houses arranged round semi-circular, open spaces or greens left on the right and left side of the road alternatively.

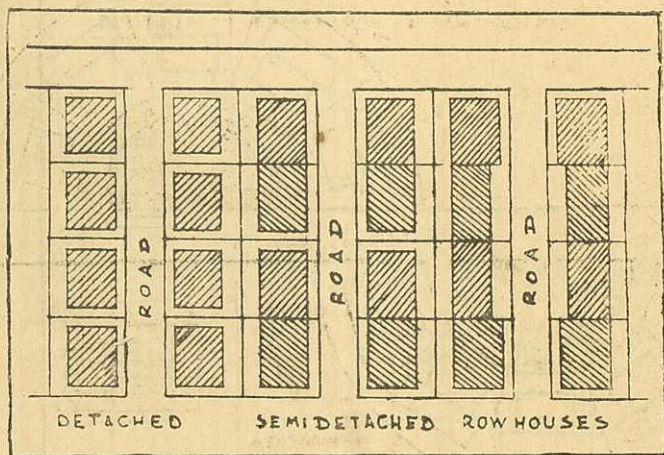


Fig. 28—DETACHED, SEMI-DETACHED AND ROW HOUSES (PLAN)

Longer the building frontage on the street, the lovelier the street picture. Note how the frontage could be increased by grouping two or more buildings. The end houses in the Row are projected slightly to improve the elevation.

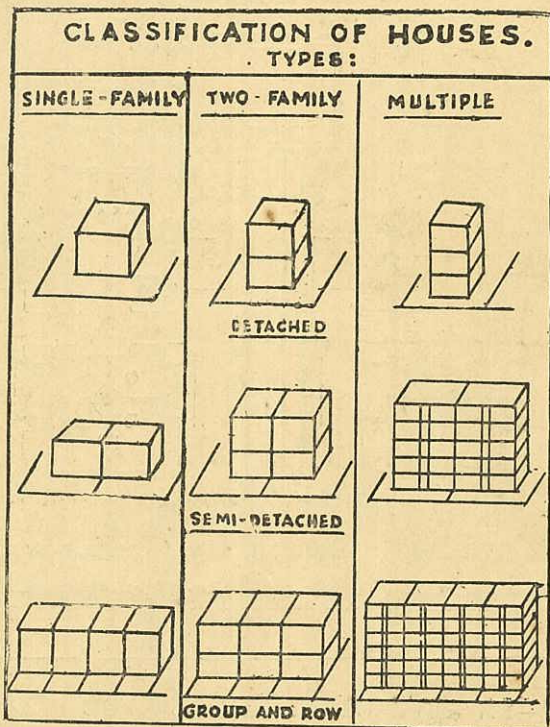


Fig. 29—DATAACHED, SEMI-DETACHED, & ROW HOUSES (elevation).

(137-8)
(5-781)

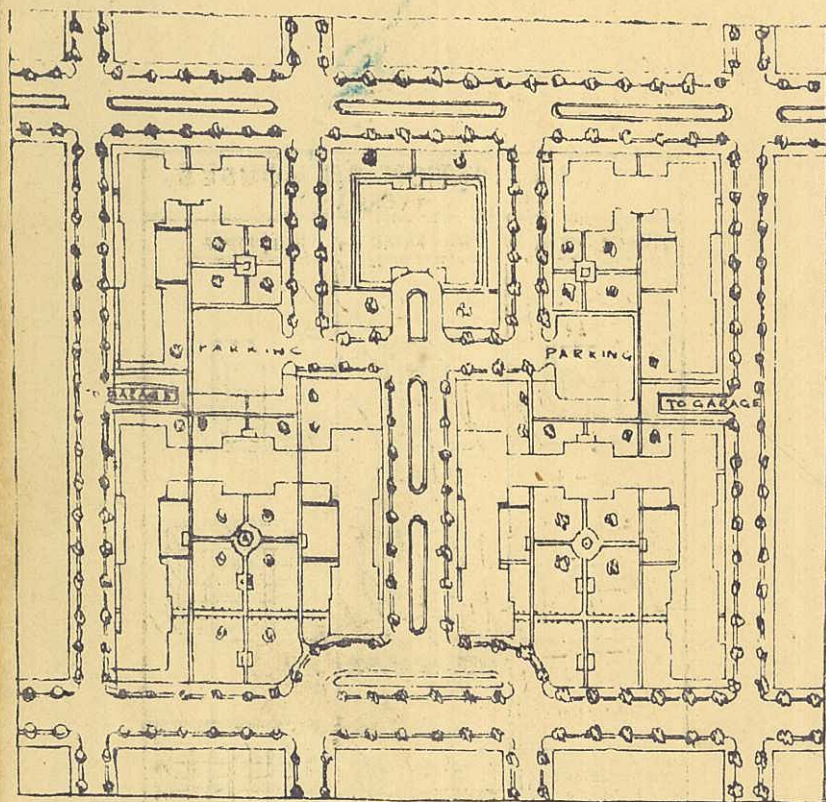


Fig. 30—AN ATTRACTIVE LAY-OUT FOR FLATS OR APARTMENT HOUSES.

Note:—the interesting combination of five units of Flats (three on top and two at the bottom). with beautiful approach roads, Greens and Parking spaces distributed evenly around the Buildings, which makes the lay-out very interesting.

(137-9)

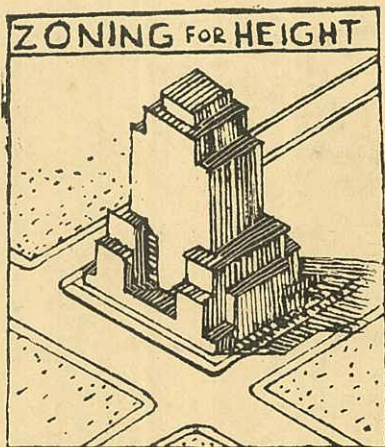


Fig. 31—SKY-SCRAPER.

Note:—How the Buildings are given offsets at Intervals to give more and more marginal open spaces, as they rise in height.

is therefore a Civic and National asset. In the words of one of the Prime Ministers of England, 'If any thing affords the means of personal growth, it is the Ownership of a house, however small but one's "Own."'

CHAPTER XI

MASTER PLAN.

(a) DEFINITION.

For any town planning to be a success, it is necessary that there should be a plan, which envisages the whole town as one Unit with a view to achieve harmony of form and design in its development and a true inter-relation of uses, in the various parts of the Town. The development or expansion of a Town, is always a lengthy process, spread over a number of years, but the development at any time is required to be controlled on the basis of a Plan. This plan is called a 'Master Plan.' A Master Plan is thus a blue print of the various proposals that are contemplated to improve the existing conditions and to control its future growth in a co-ordinated manner. Such a Plan, must be realistic, preserving the individuality of the Town, which can be ensured only if the Town is developed on a pattern, suited to its natural physical features and geographic, economic and social conditions.

(b) OBJECT OF THE MASTER PLAN:—

(i) The object of a Master Plan is, therefore to serve an over-all picture and programme

towards which the city and its environs may, in course of time grow.

(ii), Its purpose is to place various functions in such physical relation to each other, as to minimize mutual conflict.

(iii) It is meant to stimulate wider interest, in community problems and bring about a well-co-ordinated development, by focussing public attention, on diverse fields of planning activities.

(iv) It provides for intelligent spending of public funds, according to their relative urgency, for projects of permanent constructive value.

A Master plan is only a key plan usually on small scale, showing an out-line of the principal elements of city viz. broad zones, and their inter-communications etc. and a number of plans are to be prepared in its support, emphasizing every aspect of planning on a bigger scale. Such plans include a plan each for (i) present and proposed communications, (ii) present and proposed recreational open spaces, (iii) Civic and other centres and important public buildings there-in (iv) Residential districts, (v) all public amenities or institutions, (v) public services, such as sewers, water pipes, overhead and under ground cables, telephone lines etc. (vii) Boundaries of the Green Belt Area.

The various stages in the preparation of the Master plan are (i) Collection of necessary data and statistics commonly known as 'Civic Survey', (ii) preparation of the first design or proposals, as a basis for public comments or discussions (Draft plan), (iii) Publication of the draft plan for public comments and discussions, (iv) Review of the original plan or proposals in the light of the public comments (v) Preparation of the final plan or plans, with such modification as may be found necessary in the light of public comments (vi) Implementation of the master plan.

(c) FLEXIBILITY OF THE MASTER PLAN:-

The master plan cannot be considered as fixed and unchangeable even though, it is prepared with greatest care and after exhaustive study; so it is very necessary that the plan should be elastic or flexible and subject to change but only when necessity compels. That is why, it is imperative, to review the plan every five or ten years, in the light of the changed conditions and make periodic changes as may be found necessary.

(d) LAND SURVEY.

The physical structure of a Town, consists in the amount of land, that is available, within its

boundaries and its distribution among the several component parts (roads, open spaces, buildings etc.) and so, detailed survey plans, of all lands and properties in the Town are the prerequisites of all town-planning and improvement schemes. The most common forms of surveys are:—

(i) Topographical survey :—Scale $1''=4$ miles.

(ii) Aerial survey:—Scale $1''=330$ ft.

(iii) City survey:—Scale $1''=44$ ft.

(i) The topographic surveys which show the contours, are useful for a broad outline of engineering project but they are too small for town-planning purpose. (ii) The aerial surveys show only the broad features of the town such as open and built up areas, tanks, railways, parks and important buildings and also contour lines, at five feet interval in the open areas. These plans are no doubt useful, for preliminary work, in connection with any scheme or project but they are not so very useful for preparing detailed working plans. (iii) The city survey plans are generally prepared, ward by ward and each ward plan shows details of all the roads, lanes the boundaries of all private and public

properties and so such plans are indispensable for preparing detailed planning or improvement schemes and their estimates. Most of the towns in India, have prepared such city Survey plans long back and if such survey is not taken for any town, it is necessary to undertake such survey, before any major town-planning schemes are taken in hand for any town.

(e) CIVIC SURVEY.

Next important to Land Survey, is the Civic Survey, which is now looked upon, as the foundation-stone of the 'Planning Structure'. For planning or re-planning a town, it is necessary to have an intimate knowledge of the town, its existing conditions, its present and future needs.

The socio-economic survey that is taken for this purpose, is called the 'Civic Survey'. The object of the 'Civic Survey' is therefore, to collect all the necessary data, covering various field, such as, communications, housing conditions, open spaces, traffic problems, industries, etc. It is from this data, that a town-planner, can make a correct diagnosis of the various ills, from which the town is suffering, and prescribe remedies for their cure. It is only after such

diagnostic survey that he is in a position to prepare the Master plan, which is realistic.

The methods employed for the collection of the various data are (i) field work and house-to-house investigation through investigators specially appointed for this purpose, (ii) direct collection from available office records, reports, etc., published by Government, Municipality and other bodies, including private persons, (iii) collection by postal communication with Government departments, public institutions, etc., (iv) personal contacts with persons interested in various fields of planning, (v) reconnaissance and spot inspections.

(4) SCOPE OF CIVIC SURVEY.

The investigations that are to be carried out in a comprehensive civic survey, cover a vast field. A mere list of headings of the subject, as suggested by Professor Patrik Abercrombie, an authority on Town Planning in England, would suffice to show its vast scope.

I. PHYSICAL FEATURES.

- (a) Geology: showing the present arrangement of the underlying rocks, and also, where necessary, describing the

method of formation where this explains topography.

- (b) Contours: showing both actual heights and variations of surface.
- (c) Rivers, floodlands, coasts and tides.
- (d) Rainfall and wind charts worked out for the district.

II. HISTORY, ARCHAEOLOGY AND ARCHITECTURE

- (a) Studies of growth from old maps.
- (b) Archaeological remains, sites, etc.
- (c) Ancient buildings, and of architectural merit.
- (d) Architectural character: local usages and materials.

III. COMMUNICATIONS.

- (a) Roads including history of roads, traffic details of widths, tree planting.
- (b) Railways.
- (c) Waterways, rivers and canals.
- (d) Air transport:- the sites of aerodromes.
- (e) General accessibility by various means, including time as well as distance.

IV. LANDSCAPE SURVEY.

- (a) Types of country.
- (b) Soils and vegetation.
- (c) Country towns and villages as landscape features.
- (d) Disfigurement

V. INDUSTRIAL SURVEY.

- (a) Local industries: a classification; their position, number of hands employed etc.
- (b) Mineral workings including economic geology.
- (c) COMMERCE: including docks, business areas, shops etc.

VI. POPULATION

- (a) Actual amount, with increase and decrease.
- (b) Occupations and diurnal movement.
- (c) Density.

VII. HEALTH CONDITIONS.

- (a) Birth rates, death rates and disease diagrams,

VIII. HOUSING.

- (a) Historic studies.
- (b) Types of building.
- (c) Insanitary areas:-types and conditions of buildings.
- (d) Suburban development.
- (e) Rents.

IX. OPEN SPACES.

- (a) Public:-related to population and classified according to use.
- (b) Private:-degree of admission of public.
- (c) Commons and other special types of area.
- (d) Foot-path and rights of access.

X. LAND CULTIVATION.

- (a) Agriculture.
- (b) Affore station.
- (c) Allotments and small-holding.

XI. ADMINISTRATION AND FINANCE.

- (a) Local Authority areas including parishes.
- (b) Rateable values.
- (c) Land values.

XII. PUBLIC SERVICES.

- (a) Water supply.
- (b) Drainage.
- (c) Electricity.
- (d) Gas.

It would not be possible to comment on each heading or sub-heading, in a small hand book like this, as it would enlarge the chapter to a book. Every survey will not concentrate equally on every aspect. Knowledge of requirements will indicate the direction in which intensive investigation will proceed. What is important, is the use to which the survey is to be put and a limit to its extent, will be fixed accordingly.

The object of the survey is three fold:- (1) To give the planner the data upon which to work, (2) to provide corroborative evidence for the Authorities, Govt. etc. (3) as a propaganda with the public. It is only after this data is collected that it is possible to draw up the plan, which would be able to utilize every existing feature of the town, to the best advantage and provide for the most suitable method, for the development of the town

(19) PREPARATION OF MASTER PLAN.

The re-planning of an existing town is far more difficult than planning or designing a new town, on an open site. The task of an ordinary town planner is usually restricted to the replanning of an existing town and so let us see how he proceeds in preparing a master plan for an existing town, and what elements or items should receive priorities in evolving such a plan.

For the collection of data for town planning work, the town is divided into two parts, the old town and the new town. In the first part, comes the older section of town with its heritage of narrow streets, congested houses, neglected sanitation and unhygienic conditions, all constituting grave menace to Public Health. The second part covers the undeveloped or partially developed areas, which offer to the planner almost virgin field for the application of modern methods of development and control, through the provision of new arteries, zoned areas, provisions of public amenities. etc. In the first case, he has to devise ways and means, to heal up the pressing ills of the Community, having in mind, the need of immediate relief while in

the second case, he will take into consideration the time, which the anticipated growth of the town, would take, to materilise and chalk out the priorities in the programme, accordingly.

The most important point in the replanning of a town is that one must constantly keep in view, the whole city old and new alike, in all its aspects and at all it's levels and see that in the new plan, both the parts are finely blended so as to form an inseparably interwoven structure.

Obviously the starting point for preparing the plan is a map of the existing city, which shows its present boundaries, contours and all important features such as roads rivers railways, public buildings, industrial and residential areas, recreative open spaces etc. From the data collected in the Civic Survey, he is in a position to make a correct diagnosis of the various ills of the Town and suggest remedies for their cure, in shape of various proposals. Items which should receive first priorities, are as given below :—

(1) POPULATION.

As the prospective population is the ultimate basis for calculating the various needs of the city, the Town Planner has to first decide

the prospective population to be provided for say within the next 30 to 50 years, on the basis of existing population and the rate of population growth, during the last three or four decades, making due allowance for the Town's Commercial and Industrial potential.

(2) DENSITY

Next, he has to decide, what standards of densities he should adopt for the various residential areas. The standards of density vary for the town centre and the suburbs according to the value of the land and the type of buildings—houses or flats, to be allowed. In towns, where the price of land is moderate, the density should not exceed 50 to 60 persons per Acre. In congested areas of towns, where the cost of land is very high, the density can be as high as 500 to 600 persons per acre with multi-storied buildings (vertical development) having adequate open spaces all round. An average over-all density of 80 to 100 persons per acre can be tolerated in the outskirts of the town and in suburbs, contiguous to large cities.

(3) OVERSPILL.

Where the existing densities exceed the standard densities fixed as above, he has to decant

the surplus population and provide for it in new layouts. The population so decanted is, called the 'overspill'. From the size of the Overspill and the desity to be allowed in the new layout, he atonce knows how many acres of land are immediately required to rehabilitate all the displaced persons, and how many acres will be required for the future growth of the city for the plan period.

(4) GREEN BELT.

Knowing the prospective population and the over-all desity to be allowed, he calculates the total area of land required to accomodate the prospective population and fixes the future boundaries, up to which, the town will be allowed to grow. This will fix the inner boundary of the Green belt. The outer boundary will be fixed, according to the depth required and the features of the landscape, which one may like to include in the green belt on aesthetic considerations.

(5) NEIGHBOURHOODS.

In the replanning of an existing town into so many neighbourhoods, the planner has to redefine the areas, with marked individual character or social cohesion, to break down any

vast continuous areas of housing units and bring down the high densities to the desired level. He must also show how he proposes to take out of the areas, through traffic and conflicting building uses and how he proposes to provide adequate open spaces and amenities such as schools etc. in the proposed neighbourhoods.

(6) TOWN CENTRE

✓ 'PRECINTAL PLANNING PRINCIPLE' (1)

The word 'Precint' was originally used to describe the enclosed space, surrounding a church or cathedral. The word now figures prominently in modern town planning to describe an artificially enclosed space, planned to divert noise, traffic, industry and modern bustle, from some building or group of buildings where quiet is essential, such as college, library or hospital or from some historical building or buildings, which are proposed to be preserved in tact, in their original condition. The Precinct may thus be defined as an area of buildings in which through motor Traffic is excluded. Inside the precinct, the buildings will be grouped round a series of open spaces, to form a cellular pattern. If the central area is small, it may be planned to form one precinct, otherwise it

will be planned into a number of 'precincts', inter-connected by a secondary road system. The idea of 'Precinctal planning' has revolutionised the mode of approach of planners to the replanning of existing town centres. Instead of driving new streets through congested built up Areas, just for relieving congestion of traffic or obtaining vistas for important buildings, they attempt to group the buildings in a series of precincts, according to their character or function and traffic is made to circulate round them. The normal method of circulation, within the group, is by foot. After the precincts are defined, all internal roads that give through access or which serve no useful purpose, are closed and are given over to the pedestrian or used as building or parking space. Conflicting building uses are removed from inside the area and a new lay-out is prepared to give a spatial setting for buildings, both old and new. It has to be observed, that in the process of giving priority to pedestrian, proper regard is given to the need of vehicular access to Buildings inside the Precinct. The new precinct proposed around the new University centres in Bloomsbury in the County of London Plan (Fig 32) may be cited as a fine illustration of Precinctal Planning principle.

(7) INDUSTRIES.

In the replanning of an existing town, well established areas or large single factories, inside the town, will have to be accepted as being immovable, even though they may not be in an ideal position and the structure of the town will be adjusted to the same. The small factories scattered in industrial and business areas, are generally light industries and can in time be moved to new industrial estates, without harm to their economy. Sites for new industrial estates will be chosen where the land is almost level and where good connections to main road, can be obtained. Obnoxious industries and those which are likely to cause smoke nuisance, should be planned 'leeward' of the town. The industries will generally be sited on the periphery of the town, with an easy access to the main road system, so that the industrial traffic, entering the heart of the town, is kept at the minimum.

Service industries, serving the town as a whole, will be associated with the town centre and those serving the neighbourhoods will be located in the neighbourhood centres.

(8) ROADS

It has been generally accepted that the principal Traffic Arteries connecting together

the town centre, the neighbourhoods and the Industrial estates should run between their areas, leaving them as great islands, free from fast or through traffic. Each built up area will be further divided by roads, giving access to its principal parts (main streets) and it will again be sub-divided into smaller groups by the local roads (minor streets). Both for reasons of economy and safety, the width of the roads will be proportionate to the volume of traffic on them and since traffic crossings or junctions are both a source of danger and traffic-jam, they should be few and far between, on Traffic Arteries. In an ideal system of roads, the traffic should flow like a river. As water gathers in volume and the river becomes wider and bolder in scale, so do the roads become wider and broader in scale and their inter sections fewer and far between, as the traffic increases in volume.

The lay out of local streets, which are primarily meant to give access to small groups of buildings, is a question of detailed planning of the residential areas and is taken in hand at a later stage and not at the time of preparing the master plan. The list of items covered by a Master plan could be enlarged indefinitely but

for want of space, it has been cut short, restricting only to the most important items.

(h) **PLANNING TEAM.**

As town planning covers every art and science which ministers to happiness and well-being of urban community, such as Engineering, Architecture, Sociology, Public Health, Economics and Finance, it is necessary that all these important branches should be re-presented on the planning team. The team should be however led by an Engineer. who has specialized knowledge in Town-planning and should have for his assistance, atleast an architect and a sociologist.

(i) **FUNCTIONAL APPROACH TO TOWN PLANNING.**

A design for the town plan in terms of occupied areas and lines of communications will be assessed, not on the beauty of the architecture and gardens alone but its functional qualities viz. 'Are the areas adequate for the population?' Are the schools well distributed? Are the shopping centres prosperous? Do the roads convey the traffic, swiftly, safely, and cheaply? Is the journey from the place of residence to place of work, convenient and economic?

The old school of town planners solely concerned themselves, in producing visual effects, whether in architectural detail or town design and human needs were almost neglected with distrous results.

The modern school of town planners however takes into account, human needs such as the convenience of the house-wife, the prosperity of the shop-keepers and the well being of the town centre as the focal point of the whole community. In short, what a modern town-planner requires is functional approach to the design and a balance between beauty and utility or function; or to express it in another way, comfort, convenience, and economics, take equal place with aesthetics in the planners studies of folk, work and place.

(j) FINANCIAL CONSIDERATION.

After the Master plan is accepted and approved by all concerned, the first step to be taken will be (i) to determine the broad policies in respect of various matters, (ii) to prepare a list of urgent works and non-urgent works, according to their priorities. (iii) to prepare detailed Estimates of works put in the 1st priority list. (iv) to prepare a financial programme

and a schedule and to devise ways and means to carry it out, according to the schedule.

It will take many years before large part of the works, contemplated in the Master Plan, is carried out. The total cost of the works, will amount to lacs of rupees, but all the expenditure is not to be incurred immediately. It will have to be distributed over several years. Moreover, as years pass on, several modifications will have been found unavoidable, and as such, it would not be possible to stick to any estimate at the initial stage. The most important part of the Master plan will consist of reservation of land for roads, open spaces and principal public amenities, which cannot be provided for at a later date. The work proposed in the plan are for posterity and as such, a large share of the expenses, will have to be borne from 'Long-Term' loans.

(k) LEGAL STATUS OF MASTER-PLAN.

The implementation of the plan, would be impossible, if the Master plan is not made legally binding, on all the authorities, concerned, by giving it a legal status. The importance of the Master Plan, finds due recognition, in the latest Town-planning Acts on the continent but

unfortunately it finds no place, in any of the Town-planning or Trust Acts in India. So it is necessary to make suitable amendments in these Acts, to make its preparation obligatory and also to give the plan a legal status, to facilitate its implementation.

(1) IMPLEMENTATION OF MASTER-PLAN.

All planning would amount to dreaming unless the plan is translated into reality. This is possible only, when there is whole hearted co-operation, between the planner and the planned. The planner must, therefore, receive public support, both individually and collectively, if the dream is to be a reality. In fact, no plan can be imposed, but it must be accepted by all those, for whom it is prepared; that makes all the difference between 'Success' and 'Failure'.

(m) NEW CRAWLEY TOWN AND CHANDIGARH MASTER PLAN.

I would conclude this chapter by referring to Master plan of (1) New Crawley Town (near London) (2) Chandigarh, the new capital of Punjab, by way of illustration. The former represents an existing town in course of development and the latter represents altogether new Town, planned on virgin soil almost from the scratch.

(g) MASTER PLAN OF NEW CRAWLEY TOWN.
(FIG.33, 34)

The existing and proposed development of new Crawley town shown in figs 33 and 34 would illustrate how some of the principles enunciated above, are applied in actual practice. The important features of the Master plan are described below in brief-under suitable headings.

(i) GENERAL DESCRIPTION.

New Crawley is the forth of the new towns planned and built about thirty miles South of London, to assist in the de-centralisation of the Industries and their Industrial Population, from the Metropolis. The Master plan was prepared by Anthony Minoprio. M. A. F. R. I. B, A. etc. Planning Consultant of the Crawley Development Corporation.

(ii) DESIGNATED AREA

The designated area shown by chain-dotted line, covers about 5000 acres of land, which includes two existing town-ships, with a total population of about 9000 people. The area was served by very good communications by Road, Rail and even Air. The land was generally flat and its area was found to be sufficient to

unfortunately it finds no place, in any of the Town-planning or Trust Acts in India. So it is necessary to make suitable amendments in these Acts, to make its preparation obligatory and also to give the plan a legal status, to facilitate its implementation.

(1) IMPLEMENTATION OF MASTER-PLAN.

All planning would amount to dreaming unless the plan is translated into reality. This is possible only, when there is whole hearted co-operation, between the planner and the planned. The planner must, therefore, receive public support, both individually and collectively, if the dream is to be a reality. In fact, no plan can be imposed, but it must be accepted by all those, for whom it is prepared; that makes all the difference between 'Success' and 'Failure'.

(m) NEW CRAWLEY TOWN AND CHANDIGARH MASTER PLAN.

I would conclude this chapter by referring to Master plan of (1) New Crawley Town (near London), (2) Chandigarh, the new capital of Punjab, by way of illustration. The former represents an existing town in course of development and the latter represents altogether new Town, planned on virgin soil almost from the scratch.

build a self contained and balanced town of about 50000 population, with it's own Industries.

(iii) COMMUNICATIONS.

The plan of the town has a radial-cum-circular road pattern, with a double ring of neighbourhood units around the town centre at Crawley and a single industrial area at the north, near the railway line. The radial roads stop at the inner ring road and pass between neighbourhood units and not cut through them.

(iv) RESIDENTIAL NEIGHBOURHOODS.

The size and location of the residential neighbourhoods was influenced by the existing development, which was desired to be retained, by the cutting up of the designated area by main roads and railway lines and by the desire to keep the neighbourhoods of convenient size. In all, nine neighbourhoods were proposed, the average population being 5250, on the basis of net residential density of 27 persons per acre. In order to encourage social balance, all neighbourhoods will have dwellings of different types, to suit all sizes of families and all income groups. Each unit will have its own neighbourhood centre (shown by small circles) where the primary schools, local shops, church,

inns and other amenities, will be provided in a group, around a green. The smaller units claim a special advantage that the distance from the perimeter to the neighbourhood centre is rarely more than 10 minute's walk. The compactness of the town which has an average diameter of about three miles also ensures that most houses are within one and quarter mile of the town centre.

(v) INDUSTRY.

An area of 264 gross acres provides for factory site for an estimated industrial population of 8500 workers. The site is open, fairly flat and near the airport and Railway Station and is well related to the plan of the town, as a whole. Additional areas for service industries are provided to the south of the town centre, near the railway station, and also at the neighbourhood centres (in all about 75 acres).

(vi) THE TOWN CENTRE.

The town centre covering 95 acres is planned as an extension eastward of the existing development. The heart of the central area is a boulevard 400 yards long by 200 feet wide. Public buildings are sited, along the north side of this boulevard and at its east and west ends.

To the south lies the main shopping and business centre.

(vii) OPEN SPACES.

Each neighbourhood will have its own playing fields, gardens, parks etc. In addition a town's sports ground of 36 acres is provided, where a stadium, cricket, football, and Hockey grounds and tennis courts will be located. In all, the recreational open spaces provided total 629 acres. This works to 12.5 acres per 1000 population and is more than what is usually prescribed. Farm land and nursery gardens amounting to 1155 acres (about one fifth of the area) have been retained for agriculture.

(iii) GREEN BELT.

The whole of the land between the designated area and the neighbouring towns has been reserved as Green Belt Area.

MASTER PLAN OF CHANDIGARH. (Fig 35)

IMPORTANT FEATURES OF THE PLAN ARE DESCRIBED BELOW:—

(i) LANDSCAPE:— The town is situated in an area well-known for its scenic charm. It lies on a gently sloping plane, some five miles off Delhi-Kalka Road, backed by low hills and

interesting country, with the Himalayas as a permanent background. Full advantage is taken of the landscape to beautify the town. It's groves of mango trees present a pleasing feature. It has a rainfall of 45 inches a year; and the soil is capable of growing the best trees, shrubs and plantations.

(ii) POPULATION :— the town provides for a prospective population of 5 lacs, but the first phase of development will be 1.5 lacs only. The land acquired is 8919 acres.

(iii) SECTOR PLANNING :— The town is divided into 25 sectors. The residential sectors will have 240 acres of land and each sector will provide for a community from 1200 to 15,000 people (maximum). Each sector is made self-sufficient by providing all the day-to-day necessities of normal life viz. shopping centre, meeting places, hospitals, schools, nurseries, etc. The schools will be within 15 minutes' walk from homes. Anybody can conveniently walk round the whole sector in half-an-hour. The green band of open space, running from one sector into another, will take the pedestrian or cyclist in comfort, along the shaded foot-paths or cycle tracks, from one end of the city to the other.

(iv) COMMUNICATIONS:— Le Corbusier' system of 7 types of roads (7V's) for various kinds of traffic is perhaps an original contribution to town planning and this system is being applied thoroughly in Chandigarh. Roads reserved for fast traffic go round the sectors and pick up passengers on selected points on the periphery of each sector so that no passenger has to walk for more than 15 minutes to catch a bus. These fast traffic roads are an important feature of the Chandigarh Plan. They run horizontally and vertically dividing the plan into sectors $\frac{1}{2}$ mile by $\frac{1}{2}$ mile. Inside the sectors, there are roads for slow moving traffic, shaded paths for pedestrians and tracks for cycles. It is claimed that the town is literally without any traffic problems, as a result of the strict enforcement of the principle of segregation of traffic.

(v) RECREATIONAL OPEN SPACES.

A remarkable feature of the plan is continuity of the greens which stretch from one end of the city to the other and pass through the residential sections as well as the commercial centres. The idea of transforming the main boulevard of the town into a 'Leisure Valley' and placing the cultural zone, i. e. University area, quite close to it, is no doubt novel. There

will be a large central park, bordering the Avenue to the Capital. Adequate reservations have been made in all Sectors for Parks and open spaces. Heath and community centres, swimming pools and playing fields will be located in these open spaces.

(vi) CAPITOL GROUP OF BUILDINGS.

The Town will be dominated by the Capitol Group of Buildings consisting of the High Court, the Assembly House, the Secretariat, and the Raj-Bhawan. This group will be situated nearest to the hills, towards the north-east of the town. All the buildings will be of monumental character and will be distinguished for their architectural beauty. The Secretariat will be nine stories high. It is rectangular in shape (836 ft. wide and 121 ft. high) and would supply working accomodation for 3000 persons. The High Court will be four stories high.

(vii) CHANDIGARH'S CONNAUGHT PLACE.

The commercial hub of the town, comparable to New Delhi's Connaught Place, will be localated in sector 17 at the crossing of the two main avenues of the city. This sector will also contain the Town Hall and the Local Administrative offices. 236 acres of land will come

under sites reserved for big shops and commercial buildings along the major roads. Besides, there will be sites for small shops within the sectors covering 53 acres

(viii) HOUSING.

Chandigarh is an epitome of planning, planning for the people and planning in democracy. It makes history in town planning with its democratic emphasis on provision of basic amenities to all its citizens irrespective of their status or financial resources. Government servants of the lowest category (peons etc.) have been given airy, well-ventilated, two-roomed houses, with a small verandah, kitchen, compound bath room and flushed latrine, fitted with electric light. All houses partake in the parks and gardens laid out at convenient points, either individually or collectively. It is claimed that Chandigarh will have no slums and none of its communities will have any water-tight compartments of any one class or income-group.

ix. INDUSTRIAL AREA:—

Though primarily the town is planned as 'Capital' town, it has all the potentialities of becoming an Industrial Centre. 580 acres of land have been demarcated for Factories and

Industrial concerns, near the site of the Railway station. The area will be segregated from the main residential zone by a local green belt 300'x500' and will be served by a railway siding. The plot sizes vary from 1/2 to 4 acres. It is expected that 15000 persons can be provided with gainful employment in this area.

x, CHANDIGARH ARCHITECTURE:—

The architectural style arises from a study of the social needs of the people, the climatic requirements and the materials locally available. At Chandigarh, new architectural feature called "Sun-breaker" has been evolved on a mass scale. The sun-breakers, are projections of bricks and concrete fins, set at particular angles, to the walls of the house, to ensure that the rays of the sun are absorbed by the sun-breaker, during summer and the houses are not deprived of life-giving warmth of the sun, during winter.

The main features of Chandigarh architecture are most clearly seen in M. Le. Corbusier's designs for the Capitol Group of Buildings.

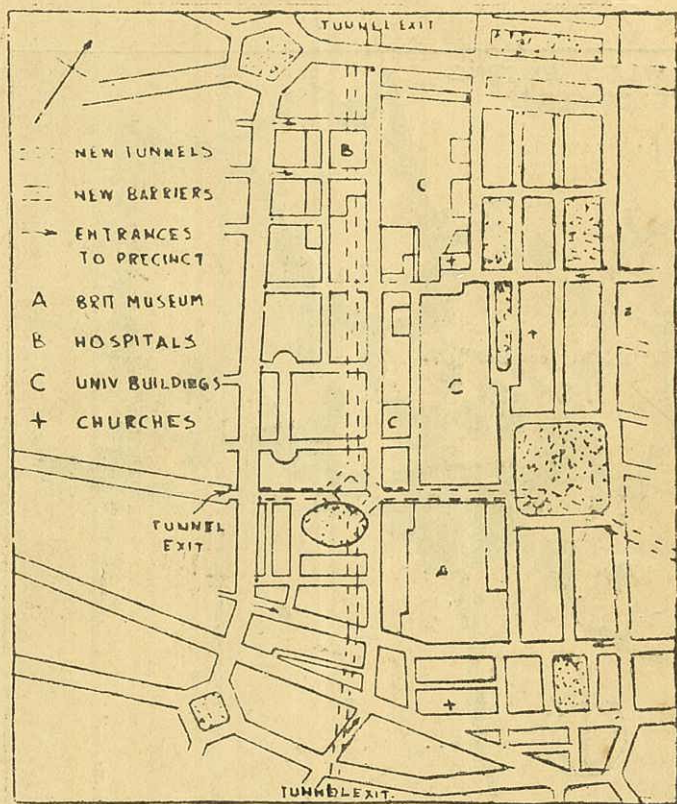


Fig. 32—BLOOMSBURY PRECINCT (PROPOSED IN THE COUNTY OF LONDON PLAN.

Note:—The whole area measuring about one mile north south and one half mile east-west, will be closed for all through traffic. A new Arterial road, carrying north-south traffic, dives under-ground and runs in a tunnel and then comes up to the surface again. Another Arterial road, traverses the precinct east-west in a similar tunnel. These new roads again intersect in a huge under-ground Round-about,

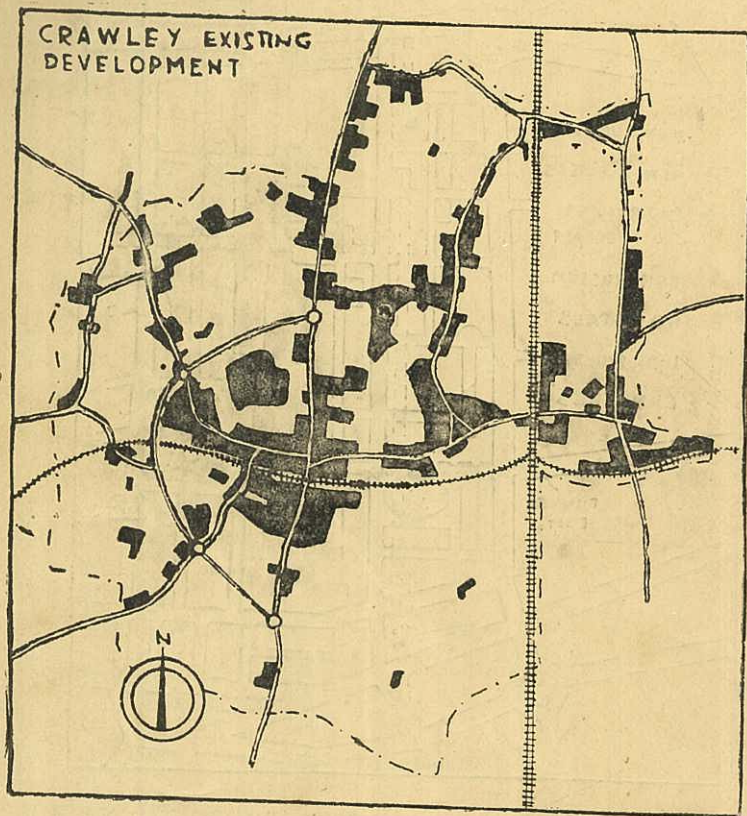


Fig 33—PLAN SHOWING EXISTING DEVELOPMENT
OF CRAWLEY TOWN (NEAR LONDON)

Note:—The Plan shows built-up areas, open spaces,
Roads, Railways. Municipal boundaries etc.

(169-3)

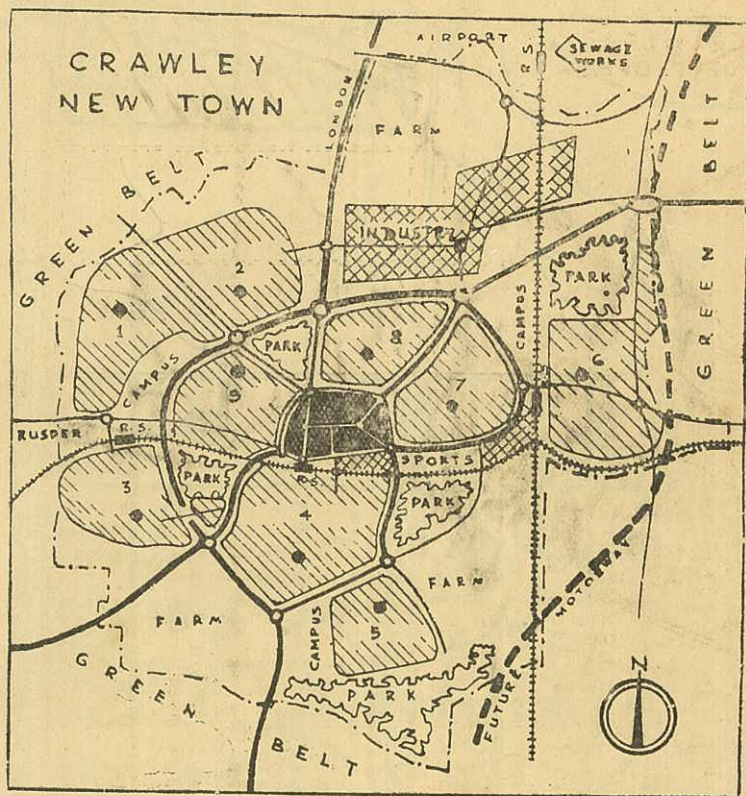


Fig. 34—PLAN SHOWING PROPOSED DEVELOPMENT OF NEW CRAWLEY TOWN.

Note:—The inner and outer ring roads with the Civic Centre at the heart, the reservation of five sites for parks and gardens, both in the interior and outside, the Industrial areas to the, near the Railway and above all the 9 unit neighbourhood structure, with a sub-centre, in each unit, from the interesting features of the Plan.

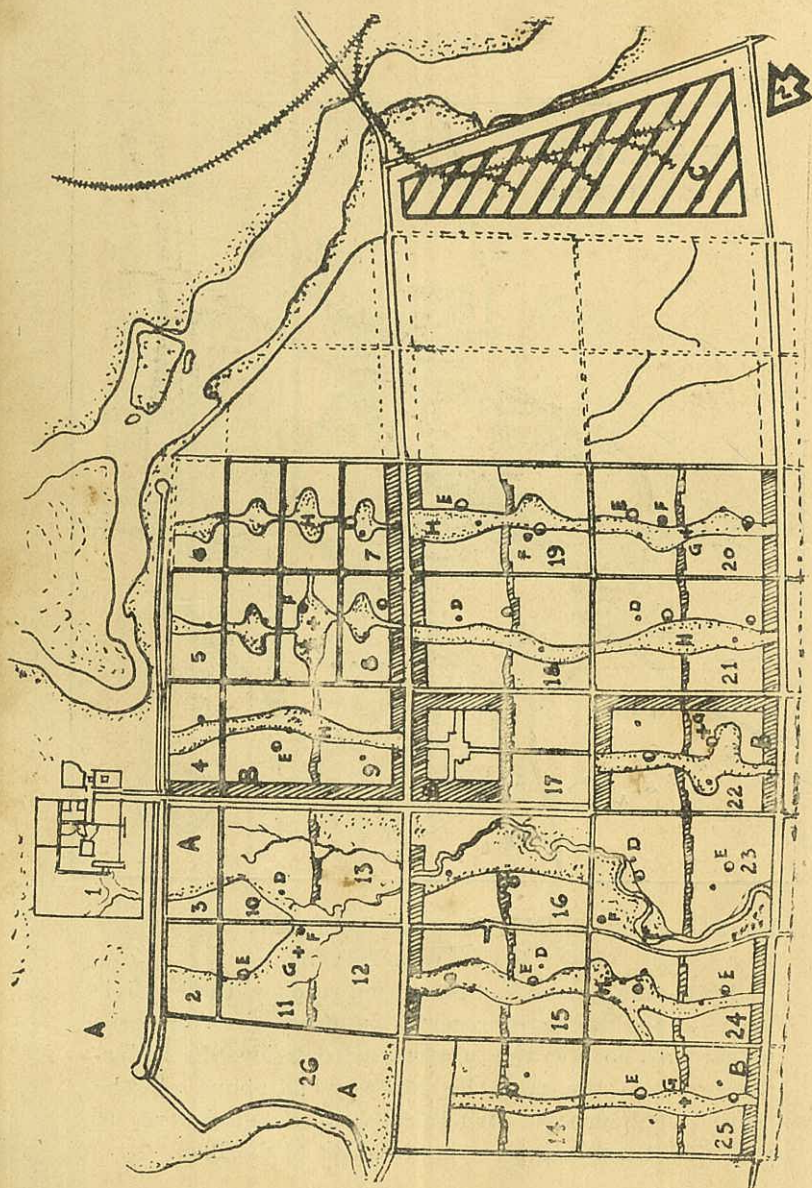


Fig. 35—CHANDIGARH MASTER PLAN.

A:—Open spaces and parks. B:—Business and commercial C:—Industrial area. D:—Elementary school. E:—Middle school. F:—High school. G:—Health centre. H:—Internal open spaces. Figs, 1 to 26:—Sectors.
(Sector 1 reserved for Government House etc.)

Note:—With its well planned neighbour-hood units, its scientifically designed Road system, its democratic emphasis on provision of civic amenities for all and its harmonious blend of all that is best, in modern Architecture, Chandigarh makes a History in Town Planning, in Free India.

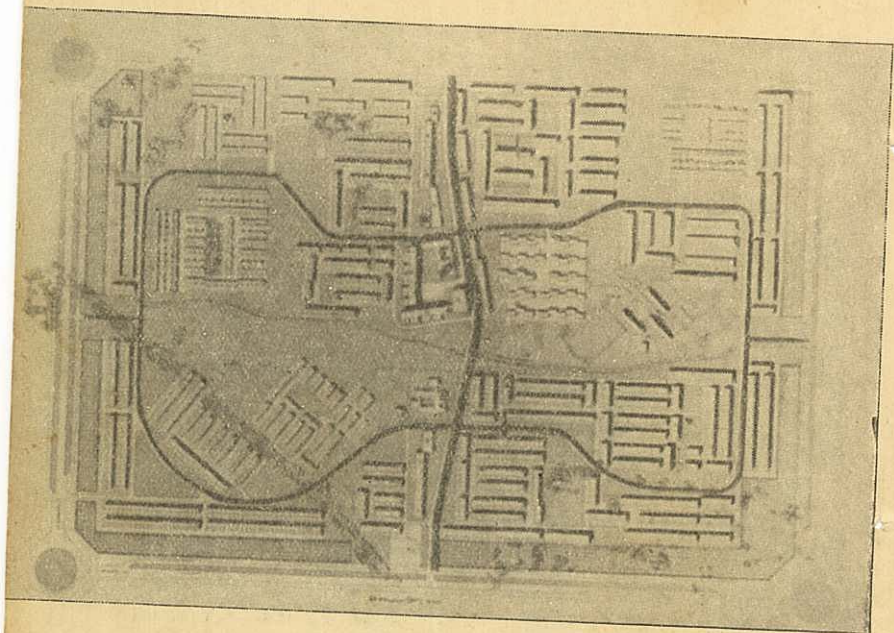


Fig. 36—LAY-OUT OF SECTOR 22 IN CHANDIGARH PLAN.

Note:—The Town is divided into 26 Sectors of this type. Each sector corresponds to a Neighbourhood unit of about 8000 to 10000 population, on an average, on about 240 acres of land. Each Sector will be self-contained with all the daily needs, provided in the unit itself. The Ring road and the road intersecting it, run informally, through the Greens. Plots on Arterial road, are reserved for Business and Commerce.

xi. GREEN BELT:—

On the boundaries of the City, nearly 3000 acres have been reserved as a Green Belt. Beyond this, lies a five mile deep band of land, which will be restricted to its present use, as agricultural land.

A city also means a place, in which citizens with rights of citizenship, live a civil life. Citizenship, civic, civilized—these are words, which denote the most civilized or advanced state of social organization and behavior that man has now attained and it is against this background that the word 'city' or 'civic' is understood.

(1) Town Planning & Town Design.

A distinction is now made between town planning and town design. Town planning with its three stages "Survey, plan and implementation" is only a prelude to town design. The purpose of the town design, is to see that the urban composition or scene not only functions properly but is pleasing in appearance and should promote one's sense of beauty and love

CHAPTER XII

CIVIC DESIGN

The town or city indicates different kinds of environment but their one essential meaning is that it is a place for urban living. By 'Urban' is commonly understood an environment, in which natural surroundings have been dominated by man-made surroundings.

A city also means a place, in which citizens with rights of citizenship, live a civil life. Citizenship, civic, civilized—these are words, which denote the most civilized or advanced state of social organization and behaviour that man has now attained and it is against this background that the word 'city' or 'civic' is understood.

(1) TOWN PLANNING & TOWN DESIGN.

A distinction is now made between town-planning and town design. Town planning with its three stages "Survey, plan and Implementation" is only a prelude to town design. The purpose of the town design, is to see that the urban composition or scene not only functions properly but is pleasing in appearance and should promote one's sense of beauty and love

of nature, which helps to secure, certain deep seated satisfaction. All the individual objects that we see in the urban scene, are therefore elements in town design for they all influence the visual picture both by their appearance as single object or by their appearance in their relation with one another. Almost every physical detail, right from the lamp post, traffic signals, a public fountain, to public buildings, in the lay-out of a city, lends itself to expression of beauty and this is now achieved by new art, which goes by the name 'Civic design' or 'Town Design'. 'Civic design' is simply an application of accepted principles of Architectural design, to some what different requirements of the city.

A city owes its dignity to its Public Buildings, or rather their Architecture.' Hence a student of town planning should necessarily know what 'Architecture' means.

WHAT IS ARCHITECTURE ?

Architecture is the art and science of building beautifully to serve the complex and varying needs of man. 'Structure, utility and aesthetics' are what we call the trinity of architecture. It is with the last that Architecture concerns

itself. It is the oldest of human arts rightly called the mother of all arts.

For good appearance, a building must be something more than a mass of stone and mortar, and it is this quality of artistic treatment that elevates a building to the dignity of architectural beauty. So architecture commences, where some embellishment or artistic feature, is added to the building, which was not a structural necessity. According to materials available, the needs of the people and methods of construction, different styles architecture, developed at different times and ages and at different places. So the so called modern architecture, is nothing but contemporary architecture, to serve the requirements of our own times. Science has revolutionised the outlook and conditions of society. We live at a different tempo to that of the past, with often different needs and with a changing pattern of social existence and activities. So if Architecture is to serve modern society, then it must reorient its approach. But even though our needs are different, it would be unwise, to do away with tradition altogether. There is no doubt that we must physically build, to suit the particular needs of our times but there is no need to entirely cast ourselves, adrift from the refining

influence of the 'Spirit' of the past. The contribution of Greece and Rome to the sum total of Western civilization, has been far reaching and significant. The same is true of India, in relation to the traditional influence of the past.

But so far as civic design is concerned, it is the association of the building with its fellows and a building in relation to its setting that is important and not the actual design of the individual building, which is the concern of pure architecture. The quality most essential to produce a beautiful city, is imagination, the ability to visualize and to put upon paper in advance a series of contrasting and harmonious features; to relieve the rigid requirements of traffic, industry and housing.

In the truly beautiful city, there is not only implied regard to utility but attention to aesthetic requirements of fitness, proportion, symmetry, order, that produce an effect of charm, dignity and magnificence, is also implied. Today we no longer consider beauty of a town as a luxury but rather as an asset. It means, increased happiness of the people. The words of Aristotle, who summarized all principles of city building may be quoted here "A city should be built to give its inhabitants security

and happiness". The science of technician will not suffice to accomplish this. We need in addition the talent of Artist. As it is not possible to deal here exhaustively with all the principles of civic design, only a few of them are given in brief below:—

(1) In a properly planned city, there should be a clear distinction made in the situation and treatment, between buildings of public character, business premises, and private dwellings; for example, the railway station and other transportation terminals, which are gateways to the city, by water, rail, highway or airway occupy conspicuous places in the town and so their design and location should measure up to high artistic standard.

(2) The town design should provide suitable terminal features for main streets and also for fine vistas of existing buildings of architectural beauty usually concealed behind a mesh of unsightly buildings, by bringing them on newly driven roads, so that they could be seen to the best advantage. In this respect, as in all others, common sense must be maintained and the passion for vistas must not override economic and practical considerations.

(3) Streets are not merely matters of utility but they may be thought of also in terms of art. Each part, pavement, sidewalk, green space and the tree, must be well proportioned. The tree is an important element of the street and makes a vital contribution to beauty, by its symmetry of growth, ample foliage, its light and shade. So every effort should be made to preserve trees, wherever they exist, and also to plant new ones, at selected places, by the side of Roads and Buildings, according to requirements.

(4) The importance of artificial light as a source of civic beauty should not be minimised.

(5) The focal points of a city also contribute in no small measure to its beauty. These may be street intersections or other open spaces. Important public buildings may be grouped round them and fountains and civic sculpture such as statues may be placed at prominent points, where they could be seen to the best advantage.

(6) As nothing detracts from or adds to the appearance of the city more than its architecture, every consideration should be given

to achieve a high architectural standard in the design of more important buildings particularly of public character. Emphasis on some appropriate feature, in every building group or street picture and the value of climax and dominance, in appropriate places, are all important to produce aesthetic effects.

(7) No less important than exercise of Architectural control is preservation of the fine architecture that has survived from the past. For instance, India has a wealth of fine specimens of temple architecture in many of its ancient towns and the importance of preservation of these ancient beauties which have high cultural value cannot be too highly emphasised.

(8) Parks, gardens and play fields are certainly conspicuous elements of beauty, in the city plan and should receive all emphasis in the Plan. Their scenic attractions are greatly increased if they contain a number of old and large trees of various kinds, a lake with a running stream and some suggestion of "hill and dale".

(9) Measures for prevention of disfigurement and removal of all ugly or unsightly

things such as indiscriminate sign boards, or bill boards, and above all, over-head electric wires, which encroach upon the aerial space and spoil road aesthetics are equally important to maintain a high standard of civic dignity. In fact, on all important roads, particularly in the commercial districts and the town centre, no overhead wires should be allowed and where they exist, they should be replaced by underground cables. A condition to this effect, should invariably be incorporated in the agreement with the electric power and light supplying Company, at the very beginning, to avoid, any dispute in future.

(10) Lastly, two more essential things are required to ensure civic dignity and architectural beauty in our towns. First there must be demand, for such beauty from prospective builders. This implies educated community, which can appreciate beauty; secondly, we must have properly qualified architects and town planners, in sufficient number, who could meet such a demand for beauty.

II LANDSCAPE ARCHITECTURE.

The art of landscape architecture plays no less important role than building architecture, in the aesthetics of a town or city but it has

still to receive adequate attention of our town planners, not only in India but even on the continent. The common man is still ignorant of the existence of such an art and he has still to realise that scenes as lovely as in the open country, can be created, not only in and around the Green-belt but within the boundaries of our cities, provided that the authorities find the necessary space and provided the right man with the requisite qualifications and experience, is chosen to carry through, the landscape layout.

The essence of town aesthetics consists in the frank recognition of two elements "town" and "Country" as representing two opposite poles of influence. The Town should indeed be frankly artificial or Urban; the country should be natural or rural. But neither can exist for human use, without some tincture of the other. Thus the landscape influence is shown by its natural setting, by the preservation of existing features, by the introduction of gardening, trees and grass etc; on the other hand, the urban influence tends towards regularity of plan, formality of buildings, use of standard types of materials and designs etc. The arts of civic and landscape design, therefore share between them this dual kingdom; of course,

both extremes viz extreme regularity and extreme naturalism, should be avoided; what is required is fine blending of the two.

Every town should be endowed, with its own type of landscape, characteristic of its physical features, topography etc. For Example a town located along-side a hill, should be conceived in layout as a rock garden. Similarly towns, which are fortunate enough to have river sides should take steps to acquire the entire river frontage and lay out there-on, pleasure walks and open spaces, planted lavishly with all the beautiful water-loving trees and herbaceous plants. Even where there are no natural hill or river features, there is nothing to prevent creating the same beauty and loveliness, artificially, by variety of plantations, in the various types of open spaces such as parks, gardens, play-fields etc. The need of planned landscape is even grater for factories and industrial estates. Factories planned in this manner, have shown considerable increase in the out-put, on account of improved morale and grater cheerfulness among the employees, due to benign and stimulating influence of nature's beauty, set amidst their canteens, shops and buildings.

Alas, how often is the spaciousness and dignity of some of our fine public buildings

ruined by mean layout of their main and subsidiary approaches? Who would not enjoy to walk through a fragrant avenue of flowering beauty, amidst spacious and trim lawns with water channel and bronze fountains in the middle and a double row of tall cypress trees on either side and then enter, a building with the thrill that such an approach would engender?

In fact, much of the grandeur and beauty of Tajmahal (the great Mausoleum of Agra). aptly described as a poem in marble, lies in its grand setting and above all its beautiful approach answering to the above description, which is considered to be the best of its kind, either in the East or West.

CHAPTER XIII

State Control on Land Ownership

RIGHTS OF OWNER-SHIP.

In its widest signification, 'ownership' to use the language of Austin means a right over a determinent thing, idenfinitive in point of time, uunrestricted in point of disposition, and unlimited in point of duration. The rights of ownership, which are supposed to be unlimited fall under three heads (1) possession (2) enjoyment (3) Disposition. In actual life however, we do not always find the rights of ownership uncontrolled under all the three heads. The obligation to respect the rights of others and the restrictions imposed by law, frequently limit the power of the owner, to deal with his property. The ownership of land as accepted by modern society. involves duties to the community, as well as rights in the individual owner. This includes complete surrender of the land to the State, (which rests upon the maxim that 'Welfare of the public is paramount power) or it may involve submission to a limitation of rights of user of the land, without surrender of ownership or possession being required.

However, there is a difference between these two types of interference with the rights of private ownership. Where property is acquired for a public purpose, the statutory law in India as well as in England, does not recognise any right of acquiring property by the State without liability to pay compensation to the owner for the loss of his property. The basis of Compensation however rests with the State to prescribe. In fact this is the basic principle of the Land Acquisition Act, which will be studied in the next chapter. In the second type of case, where the controlling power of the State, limits the use, which an owner may make of his property but does not deprive him of his ownership, the owner can claim no compensation,

In England as well as in India, owners of property have been compelled, for the last so many years, to comply with certain requirements regarding their properties, without compensation, viz provision of adequate marginal spaces for building, limited coverage of the plot etc. The underlying reason of such provisions is obviously that compliance with certain requirements, is essential in the interest of the community and that accordingly, the private owner be compelled to comply with them, even at

cost to himself. The essence of the compensation problem as regards the imposition of restrictions, appears to be this, 'At what point, does the public interest become such that a private individual, ought to be called upon, to comply at his own cost, with the restriction or requirement designed to secure that public Interest'?

In England the essential requirements for the well-being of the community have passed beyond the field of health and safety to that of convenience and amenity while in India it is still restricted to the first two items namely health and safety.

(2) BUILDING ZONING AND PRIVATE LAY-OUT REGULATIONS.

These three regulations are the most important weapons in the armoury of Town Planning authorities, like the Improvement Trusts, for controlling development of lands. The problem of maintaining the character and efficiency of the various developed areas, which an Improvement Trust has created, at so much cost and labour, is more difficult than its creation and the Improvement Trust must acquit themselves

of this onerous task, with courage and determination, even at the cost of unpopularity.

(A) BUILDING REGULATIONS.

The building regulations are generally uniform in character, covering the entire city; so it is impossible to achieve the orderly condition that can be accomplished, by establishing different requirements, for different precincts or districts as is done under zoning regulations. This explains, why building regulations alone can do very little, to improve the conditions in our towns. Unless our Municipalities are armed also with Zonning powers, they would not be able to exercise effective control on the city's development.

The Building regulations are a comprehensive code of Building Bye-laws, to control the construction of Buildings so as to satisfy all modern requirements of health, convenience, comfort and beauty. The regulations deal with various important matters, in connection with the Buildings, such as. (a) Marginal spaces to be left, (b) Proportion of built-up area to open area to be left in the plot, (c) Proportion of window area to Floor area to ensure adequate light and ventilation. (d) Height of Plinths, rooms, etc. (e) Minimum floor space of living

rooms. (f) Quality of Building Material to be used, to make the building water-proof, fire-proof, sound-proof, heat-proof and also dust and virmin-proof. The Building regulations vary from town to town. They are more liberal in small towns. The regulations operating in Improvement Trust areas, are generally more strict for obvious reasons.

NAGPUR IMPROVEMENT TRUST BUILDING REGULATIONS.

Some of the important provisions of the Building Regulations framed by the Nagpur Improvement Trust, are given in brief below, for information of the readers.

(a) MARGINAL SPACES (FRONT, SIDE AND REAR.)

In the case of buildings abutting roads of 50 ft. width or more, the front margin shall be 30 ft. For roads between 30 to 50 ft. it will be 15 ft. For roads below 30 feet, it will be 10 ft. The rear and side margins will be half the height of buildings, subject to a minimum of 10 feet for double storied building and 5 ft. for unstoried building.

(b) PROPORTION OF BUILT UP AREA TO PLOT AREA.

For small plots (below 3000 sq. ft.) it will be one-half the plot area, one-third in the case of

bigger plots (up to 20000 sq. ft.) and only one-fourth for very big plots. (above 20000 sq ft.). In shopping areas, it will be 60 p. c. of the plot area, for shop-cum-residential buildings.

(c) PROPORTION OF WINDOW AREA TO FLOOR AREA.

For the purpose of light and ventilation, the window area to be one seventh of the floor area of the room, of which at least one side should abut an open space equal to half the height of the building in width and extending to its full length.

(d) HEIGHT OF PLINTH AND LIVING ROOM.

The plinth height should be atleast one and half feet, above the road surface. The clear height of living rooms to be not less than 10 ft. For shops it, it will be not less than 12 ft. For passages it may be 8 ft.

(e) MINIMUM FLOOR AREA FOR ROOMS

The minimum floor area for a living room to be 100 sq. ft., for office room and kitchen, it will be 80 sq. ft.

(B) ZONING REGULATIONS.

Under zoning regulations land is allowed to be used only for the purpose, for which, it

is reserved in each scheme, such as residential, industrial, shopping or business; so all non-conforming use is prohibited. In addition, the Regulations control other matters, such as facades or front elevations of buildings, number of stories to be constructed, setbacks from roads, architectural styles, types of Arcades for shops etc. The architectural control seeks to ensure harmonious grouping of buildings and thereby make the street picture, as lovely as possible.

(C) STANDARDS OF OPEN SPACES.

Open spaces around buildings are required for two purposes—(1) to supply light and air to its own rooms (2) to contribute towards general open space required in and about every group of houses, to secure perfilation of air through it.

(i) 45° AND 62½° AIR PLANE RULE. (Fig 37)

The front and rear margins of buildings, are usually controlled by what is known as '45° air plane rule. This rule lays down that no part of the structure should cut at a lesser angle than 45° (to the horizontal) the plane drawn from the boundary of the plot. In other words, the open space to be left between two

buildings say of 50 ft. height, will be 50 ft, each owner contributing half, The same rule is also made applicable to correlate the building heights, with the width of roads, in which case the contribution of the road to the open space round the building, is duly taken into account. Under 45° Air plane rule, the maximum height of buildings, allowed on edges of 140 ft. road, will be 70 ft. This explains why the maximum height of Buildings, allowed in Bombay is 70 ft. on the basis of 140 ft. wide roads on an average (See Fig 38b).

It is felt that the 45° degree rule hits hard, in the case of buildings in congested or thickly populated areas and so some authorities, recommend $63\frac{1}{2}^\circ$ rule, as the open space to be left according to this rule is reduced to only half the height of the buildings. The Ratio of height to open space will be 1:1 in the case of 45° degree rule ($\tan 45^\circ$), it will be 2 to 1 in case of $63\frac{1}{2}^\circ$ degree rule ($\tan 63\frac{1}{2}^\circ$).

The above ratios are derived from the ratios of length of the shadows and the height of the buildings, obtained at the worst conditions, according to the latitude of the place and the position of the sun above the horizon. The 45° air plane rule, is no doubt suitable for cold

countries, particularly, those situated in the higher latitudes, where the anxiety is to secure as much light as possible for every house, but for places in India (South of 30° N) the sun is so high above the horizon at noon that the ratio of $1 : 1\frac{1}{2}$ ($\tan 56\frac{1}{2}^{\circ}$) is adequate to secure sunshine during the worst months, where the anxiety is rather to keep the sun away from the houses. The same ratio is adopted by the Bangalore City Municipality, but to err on the safe side, almost all the Improvement Trusts adopt 45° air plane rule, though it is considered severe or harsh.

(ii) $63\frac{1}{2}^{\circ}$ LIGHT PLANE RULE.

Another rule that commonly occurs in building regulations is what is known as $63\frac{1}{2}^{\circ}$ light plane rule. This primarily applies, where a room in a building has to depend on its side margins or open chowks for its light. Fig 38 (a)

Under this rule, the space required to be kept permanently open for the purpose of light to the abutting room should not be less than half the height of the building. So where the building is required to go higher, it has to be constructed by giving suitable offsets equal to half the additional height, to make up the deficiency in the open space required under this rule.

(iii) METHODS OF CONTROLLING HEIGHT OF SKY SCRAPERS:

In American towns especially New York, buildings commonly known as Sky Scrapers, present a special problem. These buildings rise as high as 440 feet, occupying about one acre of land and accommodating nearly 10,000 population (i. e. population of a neighbourhood, in the common city). There are various methods followed to control these heights. The first method is to regulate the height by certain multiples of the street width, usually 2 to 2½ times the width. Another method is what is known as bulk volume method, in which the volume of the building is, made equal to the volume of the prism with the plinth area as the base and height, equal to the width of the street $(1/3 \times \text{Area} \times \text{Height})$.

For the purpose of zoning regulations, the areas in each scheme is divided into a number of neighbourhoods and the zoning varies from neighbourhood to neighbourhood and supersedes the building regulations, especially in matters, where the two come in conflict.

(D) PRIVATE LAYOUT REGULATIONS:-

The object of these regulations is to control the development on lands by private persons or

countries, particularly, those situated in the higher latitudes, where the anxiety is to secure as much light as possible for every house, but for places in India (South of 30° N) the sun is so high above the horizon at noon that the ratio of $1 : 1\frac{1}{2}$ ($\tan 56\frac{1}{2}^{\circ}$) is adequate to secure sunshine during the worst months, where the anxiety is rather to keep the sun away from the houses. The same ratio is adopted by the Bangalore City Municipality, but to err on the safe side, almost all the Improvement Trusts adopt 45° air plane rule, though it is considered severe or harsh.

(ii) $63\frac{1}{2}^{\circ}$ LIGHT PLANE RULE.

Another rule that commonly occurs in building regulations is what is known as $63\frac{1}{2}^{\circ}$ light plane rule. This primarily applies, where a room in a building has to depend on its side margins or open chowks for its light. Fig 38 (a)

Under this rule, the space required to be kept permanently open for the purpose of light to the abutting room should not be less than half the height of the building. So where the building is required to go higher, it has to be constructed by giving suitable offsets equal to half the additional height, to make up the deficiency in the open space required under this rule.

agencies, so as to bring them as close as possible to Improvement Trust standards. Under lay-out regulations, such persons are required to obtain previous permission, from Improvement Trust for such lay-out and execute an agreement, undertaking to carry out various development works such as roads, sewers, water pipes etc., as per plan, sanctioned by the Trust. It is only after the development works are carried out to the satisfaction of the Improvement Trust Authorities that the plots are allowed to be sold and not till then. The refusal of building permission and demolition of buildings, constructed without or contrary to such permission, in unauthorized layouts, is an effective weapon in the hands of Improvement Trusts, to prevent haphazard development on private land.

(2) EXISTING TOWN IMPROVEMENT LEGISLATION AND THE LAW OF COMPENSATION.

Section 23 and 24 of the Land Acquisition Act lays down the basic law for the determination of the compensation, in which the primary factor is the working out of the market value. Though the legislature has not defined the market value, according to various court rulings, it is interpreted as Potential value (i. e. the best value it is capable of, when the property is put

to the most profitable use) and not the *actual use value*, on the day of the first notification of the scheme. This brings in, an important question viz., who is entitled to the potential increase in value or the unearned increment? In fact, the potential value is a great obstacle in planning as it makes the Acquisition Cost prohibitive.

To over-come this obstacle, the law of compensation and its application to acquisition of land, for the execution of town-planning and improvement schemes has been amended in the special Acts which were subsequently enacted for Town planning bodies like Improvement Trusts. In these Acts, the market value is restricted to mean the actual use value of the property, on the date of the first notification. As a result of this provision, an owner of land, whose land is acquired for such scheme, is deprived of the potential value of the land, which he would have otherwise received, under the ordinary law of acquisition. This law is considered harsh and inequitable by the private owner but its justification is obvious, when looked at from the point of larger interests of the community as a whole.

(4) PRINCIPLE OF UNEARNED INCREMENT.

An increase in the value of the property due to improvements schemes of the Trust or the Municipality and not due to ones own efforts, is called unearned increment and so it is but fair that it should go to the community at large i. e. to the Municipality or the Trust who represent such communities. The unearned increment, which accrues to the owners of the land, near towns and industrial areas owing to urban developments, has an adverse effect upon planning. It would be relevant to quote here the recommendation of the Health, Survey and development committee (commonly known as Bhore Committee) — "We therefore recommend that the provisions of the Land Acquisition Act, governing the acquisition and ownership of the land be reviewed, with a view to making such amendments, as would remove the present obstacle to the acquisition of new lands for building and planning purpose and to the control of the increment value of the land, suitable for housing estates and town development."

(5) BETTERMENT.

The principle of betterment is that persons benefitted by public expenditure, should be

made to contribute to such expenditure, a reasonable share (generally 50 p.c.) of the increase in the value of a property, due to such expenditure. The right to recover such share of the increase in value or the unearned increment is conferred upon Improvement Trusts by the levy of a betterment contribution, to which further reference is made in the next chapter.

(6) HOUSE OWNER-SHIP AND TENURE

The two types of tenure that are widely recognized are (i) Free-hold, (ii) Lease hold.

(i) Free hold.—This is the basic form of tenure and is the most popular type. Buildings held under free-hold rights are usually free, from restriction, at any rate, so far as private houses are concerned. In this type, the owner is at liberty to do as he likes, within the limits of good management and subject to the requirements of Municipal and other regulations, that may be in force.

(ii) Lease hold.—In this case the purchaser holds the land on lease. A lease of an immovable property is a transfer of a right, to enjoy such property, for a certain period say 30 to 99 years, in consideration of the price paid called 'Premium' plus some annual or periodical levy,

by way of ground rent, based on certain percentage on the premium say 2 to 6½ p.c. The transferer is called 'Lesscor' and the transferee is called 'Lessee'.

Free-hold tenure gives a sense of absolute ownership while with lease-hold, there is a feeling that with every passing year, the value of his interest in the property is diminishing and that on the top, there is the annual recurring liability to pay the ground rent.

It is contended that free-hold tenure is not compatible, with sound planning, as it does not admit of any effective control, on behalf on the community, over the use of the land or the building, constructed thereon. Such control is possible only with leasehold tenure. Another point is that on the expiry of the lease, the land reverts to the Lessor. This reversion is free of charge and the Town Planning Authority gets the advantage of any increase in value. A still greater advantage is that this permits replanning, without the necessity of having to pay compensation for the acquisition of the land or the building there-on and that is why Improvement Trusts, invariably sell their plots on lease-hold rights. Of course, the ideal plan is complete nationalisation of all the land in the city and thereby prevent its speculative

(196)

value; but till then the only alternative is lease-hold tenure for all Government and Trust lands coming under development schemes.

(7) THE TOWN AND COUNTRY PLANNING ACT OF 1947, IN ENGLAND.

It would not be out of place to make a brief reference to latest town planning enactment in England, just to show the latest trends in Town planning legislation. The Act is quite revolutionary in many respects and also most extensive in scope and repeals all previous planning legislation, from 1st July 1948. The outstanding features of this act are —

(i) The town planning schemes of former enactments, will be replaced by development plans, made under the new Act. The first development plans which are made compulsory, are to be submitted, for the approval of the town and country planning Ministry, within three years and thereafter it is subject to compulsory review every five years.

(ii) The Act confers new and wider powers of compulsory purchase, of all such land as has been designated in the development Plan, as being liable to compulsory purchase, by the

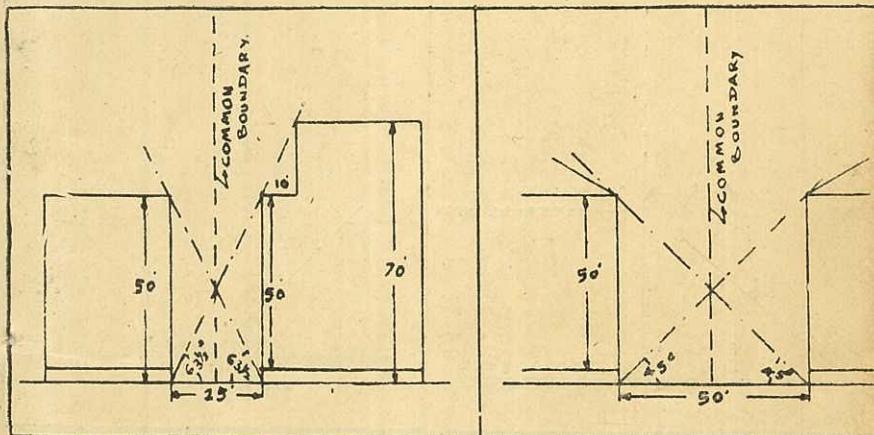
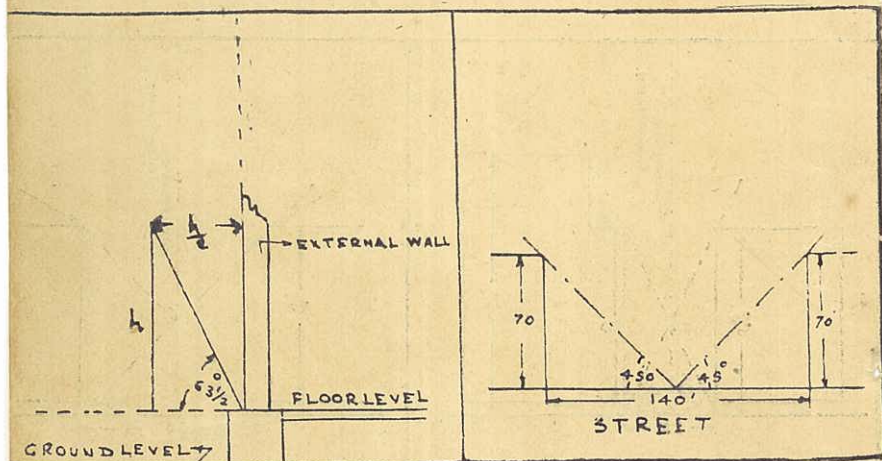


Fig. 37:--(a) 63 1/2° AIR PLANE. Fig. 37:--(b) 45° AIR PLANE.
 Fig. 37:—(a) This shows that for buildings 50 ft in height, the rear marginal open space, should be only 25 ft. Please note that 10 ft horizontal offset is given at the height of 50 ft, to the right-hand-side Building, raised to 70 ft height it should not cut the 63 1/2° Air Plane.

Fig. 37:—(b) Under the 45° Air Plane rule, The total rear marginal space to be left between two Buildings 50 ft high, will be 50 ft (equal to the height) each owner contributing half and half.



(a)

(b)

Fig. 38:-(a) $63\frac{1}{2}^\circ$ LIGHT PLANE RULE. Fig. 38:-(b) 45° AIR PLANE AND ROAD WIDTH.

Fig. 38:-(a) Note that the Light Plane is drawn at the Plinth level and not at the Ground level, which is the case with the Air Plane. Under the Light Plane Rule, the marginal open space to be left, is half the height of the building above the Plinth.

Fig. 38:-(b) It shows that the maximum height of Buildings abutting 140 ft street, shall be not more than 70 ft, (half the width) on the basis of the 45° Air Plane Rule, assuming that the space contributed by the street, is shared equally by the opposite Building.

local Authority, within the period, fixed in this behalf.

(iii) The Act fixes the value of the lands, at their existing use value; so the vendor, when he sells his land, will get this value only and will lose the State such development value, as the land possesses.

(iv) The view taken in this connection is that land owners are not entitled to compensation for the loss of development value of their land but with a view to avoid hardship, the Act nevertheless provides for making payments to land owners for this loss and a capital sum of £ 300 millions has been set aside for this purpose.

(v) Powers have been also given under the Act for levying Betterment charges, of land for which planning permission has been given. It is therefore high time that suitable legislation on similar lines, is undertaken in India also, to remove the various obstacles in planning.

CHAPTER XIV

Land Acquisition, Improvement Trust & Town Planning Acts

(1) LAND ACQUISITION ACT OF 1894.

The right of the State to appropriate or acquire private property for public utility or purpose, has been recognized in all civilized countries. The principle behind the Act is that the welfare of the people or the community is the paramount law and that private interests are always subordinate to the interests of the community. This power is however not of confiscatory nature but imposes an obligation on the State, to pay reasonable compensation to the person, before dispossessing him of his land. The distribution of the land into so many ownerships, is the main obstacle in the task of improvements of towns and the object of all acquisition, is to pool the ownership, in a single authority, for the purpose of comprehensive planning and improvements

(i) AIMS & OBJECTS

The object of the L. A. Act is to provide, a speedy method of determining compensation to be paid for the land acquired. The act also points

out the manner in which the land is to be acquired, the procedure and the formalities to be followed in this behalf and various other matters, connected with the acquisition.

The Act deals with the law for the acquisition of land for 'Public purpose' and for 'Companies'. The land acquisition cases can be divided into two categories viz., (i) land acquired for local authorities like Municipalities, (ii) land acquired for registered companies or societies, usually Public-utility Concerns. Here the land is taken to mean every thing connected with land such as buildings standing, on it, standing crops, trees and all interests, charges etc. connected with it. Public purpose, though not defined in the Act, usually means a purpose meant to benefit the community or a large section of the community and not a couple of individuals. Under the Act, Government is the sole judge in the matter and notification under Section (6) of the Act, is issued only after Government has been satisfied that the land in question, is really required for a public purpose.

(ii) AWARD.

The order passed by the L. A. Officer appointed by Government or their nominee

after making due enquiries on an acquisition case, fixing the final area of the land, the total amount of compensation to be paid and its apportionment among the various co-sharers, is called "Award". The award is final unless a reference is made against it in time to a court appointed to hear such references in which case the decision of the court, will be final and binding on all the parties.

(iii) PROCEDURE.

The procedure followed for acquisition of properties under the L. A. Act is described in brief as below:—

Section 4.—Preliminary notification

As soon as the local Govt. thinks that any land is required for public purpose, a notification to that effect is published in the Govt. Gazette. A public notice has also to be given in the locality.

Section 5-A—Hearing of objections,

Persons interested in the properties proposed for acquisition, will send their objections in writing to the Collector within 30 days of the preliminary notification.

Section 6.—Declaration of Intended Acquisition.

If the local Government after taking into consideration all the objections, comes to the conclusion that the acquisition of any land is really necessary, a declaration to that effect is made in the Government Gazette. The said declaration shall be conclusive evidence that the land is needed for a public purpose and after such declaration, the collector may proceed to acquire.

Section 9.—Notice to persons interested.

The collector will give notice to all persons interested, in the lands that the Government wants to take possession of, and invite claims to compensation from them.

Section 11.—Award by the Collector.

The collector will make enquiries into the claims of all persons interested in the land and then pass his award.

Section 16.—Taking possession.

After the award is made, the Collector will proceed to take possession of the land, which will then absolutely vest in the Government, free from all encumbrances.

Section 18 — Reference to Court against the Collector's Award

Any person interested, in the property who is dis-satisfied with the award in any respect, may make a reference to a Court and the orders of the Court will be final and binding both on the party and the Government. In cases, where a reference is made to the Court against the Collectors' Award, the Collector will deposit the amount of compensation according to his award in the court and may take possession without waiting for the decision of the court.

Section 23 & 24, — Determination of Compensation

The sections lay down the basic law for the determination of the Compensation, in which the primary factor is the working out of the market value. These are described in detail in the last Chapter.

(2) NAGPUR IMPROVEMENT TRUST ACT OF 1936
(WITH SUBSEQUENT AMENDMENTS)

(i) NECESSITY OF IMPROVEMENT TRUSTS.

To begin with it was felt that local Municipalities or Corporations which were the legal custodians of the health of city, would be suitable agency, to shoulder the responsibility of all

planning or improvement work, in the city, but it was soon realised that the task was beyond the capacity of these bodies, for more than one reason viz., (i) encumbrance with multi-farious duties, under the Municipal acts, which occupied all their time in day to day administration, (ii) inadequate powers under the Municipal Act, for town planning work which was easier only with special town-planning enactments, (iii) Lack of properly qualified staff with specialized knowledge in town planning and allied work (iv) Red tapism or dilatory working characteristic of all elective bodies, (v) General financial stringency, preventing them even to meet their normal obligations, such as water supply and drainage.

It was therefore rightly thought that it was not only desirable but necessary to entrust the task of town-planning and improvement, to an independent statutory body like an 'Improvement Trust' or 'Development Board'. In fact it was in big cities like Calcutta, Bombay and Madras that Improvement Trusts were first created and they worked side by side with Corporations, though as quite independent bodies. It may be mentioned here that the health survey committee (popularly known as Bore Committee) also emphatically expressed itself in favour of

entrusting the task to Improvement Trusts, notwithstanding 'Corporations'.

(ii) WORKING OF IMPROVEMENT TRUSTS.

In India there are hardly a dozen of statutory town-planning bodies popularly known as Improvement Trusts and Development Boards, which are restricted only to large commercial and industrial cities, each with its own Act. Though the Acts are different, the general working is almost similar and so the provisions in the various Acts are more or less common. Only the important of them will be studied in this chapter with special reference to the Nagpur Improvement Trust Act.

(iii) TYPES OF IMPROVEMENT SCHEMES.

Any proposals for planning or improvements are first to be reduced to the form of an improvement scheme and a plan to show the proposals in details.

The schemes are given different names, according to the main purpose, for which the scheme is framed or according to its positive or negative character e.g., housing or rehousing schemes and deferred street schemes etc. Another classification is "controlled schemes" and development schemes".

Controlled schemes are restrictive or negative in character and the object is only to control the development in any area but there is no intention of immediately going in for any acquisition. The development schemes on the other other hand, are positive and the object is to immediately acquire the necessary lands and develop the whole area covered by the scheme and sell the plots, to recoup the money spent in the development.

(iv) PROCEDURE FOR PREPARATION OF IMPROVEMENT SCHEMES:—

- (a) The Trust may take up any scheme on its own initiative or on the official representation of the Municipality or the Corporation or on written complaints of 25 residents of any ward.
- (b) After the scheme is prepared, it is to be published in Government Gazette and in local papers with a map of the area and all particulars of the scheme with the list of properties put under acquisition or betterment
- (c) Within 30 days of the notice, the Trust must also serve individual notices on all persons affected by the scheme

and invite their objections to the proposals, if any, within the prescribed period.

- (d) After the expiration of the time given in the notice, the Trust shall consider all objections and hear any representations and then send the scheme to the Local Government for sanction, with such modifications, as may be found necessary.
- (e) Every application for such sanction shall supply full particulars of the schemes, its estimated cost, list of Govt. lands affected, statements of objections received and the decisions on such objections and Trust proposals for rehousing the evictees or displaced persons. The local Government may sanction the scheme or reject it out-right or return it to be Trust for reconsideration or modification.
- (f) When the local Govt. sanctions the scheme, it will announce it in the Govt. Gazette and order for the vesting of Govt. lands affected by the scheme. The Trust then may proceed to execute the scheme, The publication, of the above

notification shall be conclusive evidence that the scheme is duly framed and sanctioned.

(v) ACQUISITION OF LAND FOR IMPROVEMENT SCHEMES.

The field of the activity of Improvement Trusts is very vast and so the act empowers them to acquire land, compulsorily for the purpose of any schemes defined in the Act.

It is open for the Trust to do it in two ways (i) by private negotiations or agreement, (ii) by compulsory acquisition under the L. A. Act as amended by the schedule attached to the Improvement Trust Act. The first mode of acquisition, can be resorted only when the land is small and the title is undisputed and there is no risk of any litigation in future but second mode is the best, where large areas are to be acquired for the reason that the land acquired under the land acquisition act vests, absolutely in the Improvement Trust, free from any encumbrances and all private rights such as easements etc. are liquidated.

(vi) SCHEDULE MODIFYING PROVISIONS IN L. A. ACT.

Under Section 61 (b) of the Trust Act, the provisions of the L. A. Act regarding the

payment of compensation, have been considerably modified by the schedule attached to Trust Act, in their application to the acquisitions made for the Trust. The most important of the modifications are given below.

(i) The market value will be according to the *actual use* to which the land had been put, at the time of the first notification and not according to its *potential value*, e. g., land which is actually used for cultivation at the time of acquisition, will be valued as agricultural land and paid for as such, even though it may have higher potential value as building site, on account of its favourable location viz., proximity to developing parts of the town or any other factors.

(ii) Extra 15 p.c. on the market value on account of compulsory acquisition, is not to be paid except in the following cases viz., (i) land and building in the actual occupation of the owner or occupation or by his relatives, free of rent, (ii) Gardens not let to tenants but kept by the owner for his own use.

(iii) In the case of buildings so overcrowded, as to be dangerous to the health of the occupants of such buildings, the compensation will

be paid, not on the basis of actual rental value, in this overcrowded condition, but on the basis of such reasonable rent that may be expected from it, if occupied by the normal number of tenants.

(iv) For buildings in not good state of repairs, the market value shall not exceed the rental value of the building, after necessary repairs shall have been carried out, minus the estimated cost of such repairs.

(v) In case of buildings in slums and declared unfit for human habitation, the compensation will not exceed the value of the materials of the building minus the cost of demolition (i.e. Debris value).

The principle behind (i) is known as the principle of unearned income and has been already referred to. The principle behind (iii) and (iv) is that in the interest of the community, the landlord who has created or trying to create slums, by either constructing sub-standard structures or by allowing over-crowding and congestion on his lands or buildings should be rather penalised than compensated, for acts which are considered to be anti-social.

(vii) SPECIAL POWERS OF SURPLUS ACQUISITION
& ACQUISITION IN ADVANCE OF REQUIRE-
MENTS.

Another point of difference, which deserves special mention is the wider powers given to Improvement Trusts in certain aspects of acquisition, viz., (1) Power of surplus acquisition, [2] Power of acquiring in advance of requirement. Under the L. A. Act. a local body has got no power to acquire land, beyond what is absolutely needed for immediate purpose which is obviously inadequate for large scale planning or improvement work.

(viii) BETTERMENT CONTRIBUTION.

The principle of betterment is that persons benefitted by public expenditure, should contribute to such expenditure, a reasonable share of the increase in the value of the property due to such expenditure. Under Section 60 of the Trust Act, the Trust can recover betterment charges from such owners of properties which are likely to be benefitted from any improvement schemes. The important provisions in the Trust Act regarding Betterment are given below: —

- (1) The list of properties put to betterment must be published with the first notification

under Section 39 of the Act. Individual notices are also to be given to respective owners and their objections invited.

(2) The betterment contribution will be 50% of the increase in the value of the property due to the execution of the scheme.

(3) The betterment will be assessed only after the completion of the scheme. In case of dispute, the party aggrieved can make a reference to the Tribunal, whose decision will be final.

(4) No betterment contribution is payable by Government, Local Authority and Public Institution, in respect of any land belonging to them.

(ix) ABANDONMENT OF ACQUISITION IN CONSIDERATION OF SPECIAL PAYMENT.

Section 69 of the Trust Act, empowers the Trust to abandon any land from acquisition, even after the sanction of the scheme, if such acquisition is discovered to be unnecessary for execution of the scheme provided the owner agrees to develop the land according to the conditions of the Trust and further agrees to pay abandonment charges equal to 50% of the

increase in the value of the property, due to the execution of the scheme.

Properties are abandoned from acquisition under the following circumstances:—

(a) Where the property is included in the acquisition list, through mistake or oversight.

(b) Where there is a substantial structure on the land and only a small portion of the open land is required for any work, it would be in the interest of the Trust to acquire only a portion of the land actually required and abandon the rest from acquisition in order to economise in the cost of acquisition, which may be otherwise very heavy.

Some of the important provisions regarding the abandonment are: (1) Application for the abandonment has to be made to the Trust by the party, before the passing of the award.

(2) After the Trust agrees to abandonment, the party has to execute an agreement, in token of his having agreed to develop the property according to Trust Conditions and pay abandonment charges as per law.

(3) The Trust will inform the L. A. Court that the land has been abandoned from acquisition and the acquisition proceeding will be

deemed to have been dropped from such date.

(4) All the provisions regarding assessment, recovery of betterment, will apply *mutatis mutadis* to the assessment and recovery of abandonment charges.

(x) FINANCE.

Activities of all Improvement Trusts or other planning bodies are ultimately to be tested on the touch stone of finance and the success or failure depends upon, how they tackle this intricate question. It is now an accepted principle that a town must pay for its own services, improvement and the State will help by way of free grants for only special and essential purposes such as water-supply, drainage etc., otherwise the Improvement Trust must stand upon its own feet. Unlike the Municipal bodies, the Improvement Trusts cannot levy any taxes and so naturally they have a very limited recurring income; so they are more like Public utility concerns or business bodies, with the difference that they should only aim at being self-supporting but not try for undue profits. It may be pointed in this connection that the Improvement schemes fall into two categories, (1) Remunerative schemes, (2) Unremunerative schemes, like slum clearance schemes. The expan-

sion schemes in open lands are generally remunerative on account of the low cost of acquisition. So the object should be that whatever loss is incurred on un-remunerative schemes, is made up in remunerative schemes.

(xi) RECURRING & NON-RECURRING INCOME.

(a) *Recurring Income.*

The main sources of Improvement Trust income which are of recurring nature are as below—

(1) Municipal contribution.

Section 83 of the Act imposes a statutory obligation on the Corporation to pay this contribution calculated at a sum equivalent to 1/2 p.c. per quarter of the Annuaire ratable valuation of houses, within the Corporation area, subject to a minimum of 1 lakh. This would progressively increase with the construction of new houses on the plots sold by the Trust:

(2) Stamp duty.

Under Section 77 of N.I.T. Act, Stamp duty on instruments of sale, gift etc. affecting immovable property, within the Area, to which the N. I. T. Act extends, has been increased by 1/2 percent on the value of the property.

(3) Annual ground rent.

The land developed by the Trust is invariably given on long lease-hold rights with 2 per cent ground rent and this rent is annually recovered from the holders of Trust plots. This income would also increase progressively with the progress of development and sale of plots in the various schemes.

(4) Municipal and Govt. Share on Nazul income from the sale of Nazul land.

(5) Miscellaneous receipts.

(b) Non-recurring Income.

The principal sources of non-recurring income are—

(1) Premium from the sale of plots.

(2) Betterment contributions.

(3) Abandonment charges.

For the purpose of Financial policy, both the income and expenditure of the Trust must be divided into two categories viz., revenue and capital. The expenditure incurred on departments or items of purely administrative character (Estate, Building departments etc.) which has no bearing on the execution of Improvement schemes, ought to be debited to revenue

account, while all the capital expenditure incurred for the execution of the improvement schemes, ought to be debited to capital returns, referred to above and the aim should be to balance the two, to avoid any financial embarrassment.

The expenditure of the various improvement schemes is invariably financed from the permit or sale proceeds from the plots in the developed lands but there is always a time lag in capital returns, as against capital expenditure, as the land must be first acquired and developed at considerable costs, before it can be sold in plots. That is why the Improvement Trusts have to go in, for long term loans, at the start of their career and then go in, for short-term loans, to tide over unexpected situations, or temporary setbacks. For the payment of these loans, the Improvement Trusts must prepare a financial programme and stick to it, as far as possible. In short, the success of Improvement Trusts, depends upon, not only on the soundness of the various schemes but the ability with which their financial side is tackled by those at the helm of their administration.

(xii) BUILDING, ZONING AND PRIVATE LAY-OUT REGULATIONS.

The power of framing the above Regulations is conferred upon the Trust under clauses (g) and (h) of Sec. 90 of the Act and what is required is strict enforcement of these Regulations. These are dealt with in last chapter in details.

(xiii) DISSOLUTION OF THE IMPROVEMENT TRUST.

Last section of the Act (section 121) provides for dissolution of the Trust, when the execution of all the sanctioned schemes has been completed and further continuance of the Body is not necessary. It may be observed that the Improvement of towns is primarily the function of Municipal bodies, and the Improvement Trusts, act only as their agents and it is in the fitness of things that they should merge in the Municipal committees, after the function for which it was created, is over.

(3) C. P. & BERAR TOWN PLANNING ACT OF 1948.

The Act is prepared on the lines of the Bombay Town-planning Act of 1915, which was the first town planning Act in India. The Act is meant for smaller towns, which cannot

afford to have an independent body like an Improvement Trust, which is possible only for big cities. The Act, when applied to Municipal areas, confer valuable powers yet entrusted to a local Authority. The procedure prescribed for preparation and submission of a town-planning scheme is almost similar to the one in the Improvement Trust Act.

(i) IMPORTANT FEATURES OR PRINCIPLES.

An important feature of the Act is that the land required for public purpose such as roads, playgrounds etc., is first set aside and the remaining land is re-distributed, among the original land-owners, by way of reconstituted plots, instead of entirely dispossessing them.

Another principle running through the Act is to make the owner of the land a co-partner with the local authority. He is consulted at every stage in the preparation of the draft scheme; he can approach the arbitrator for any of his grievances at the first instance and in case of adverse decision from him, he can appeal to the Tribunal, which is the final authority in all important matters, such as the valuation of the property, levy of the increment contribution etc.

The method of meeting the whole cost of the scheme from the contribution to be recovered from the owners of the land, benefitted by the scheme, is no doubt novel and it would be interesting to study, how it is done in actual practice.

(ii) THREE STAGES OF VALUATION.

The valuation of land is done in three stages mentioned below:—

(1) Original value—This is the original value of the land on the date of the first notification and does not take into account any of the effects of the improvement scheme that is to follow.

(2) Semi-final value—This is the value of the reconstituted plots allotted in their new size and shape but in its original condition, ignoring the benefits from the scheme.

(3) Final value—This is the enhanced value of the reconstituted plots due to the scheme.

The difference between the first two is the compensation that is due to the owner. Instead of paying in cash, it is allowed as a set-off, against the recovery of increment contribution

due from the owner and so much amount is credited in his account with the local Authority.

The difference between the second and third is the increment in the value of the reconstituted plots that remain with the owner on the completion of the scheme. Only 50 p.c. of the increment can be recovered from the owner as his increment contribution towards the cost of the scheme and no more. Any excess incurred will have to be met by the local authority from their funds.

(iii) CALCULATION OF THE ACTUAL PERCENTAGE FOR ASSESSING.

The actual p.c. is calculated from the total cost of the scheme and total increase in the value of all the reconstituted plots. For example, suppose the total cost of the scheme is say $\frac{1}{2}$ lac and the total increment in the value of all the reconstituted plots is say $1\frac{1}{2}$ lac, then the increment contribution is only $\frac{1}{3}$ of the total increment in value ($\frac{1}{2}$ lac, divided by $1\frac{1}{2}$ lacs) so each person will pay only $\frac{33\frac{1}{3}}{100}$ p. c. of the increase in the value and not 50 p.c., as the local Authority is debarred from making any profit from the scheme.

(iv) STATUTORY AUTHORITIES IN THE ACT.

There are three Statutory Authorities mentioned in the Act: (1) Local Authority, (2) Arbitrator, (3) Tribunal of Arbitration.

(a) LOCAL AUTHORITY.—Every town planning scheme is to be prepared by the local Authority in whose boundaries the land proposed to be developed is situated. Such scheme is prepared after following the prescribed procedure, and it then sent to Government for preliminary sanction or approval. After this preliminary sanction, the draft scheme goes to the Arbitrator.

(b) ARBITRATOR.—The work of valuing the properties at the three stages described above, and working out the increment contribution etc. involves expert knowledge of valuation of properties, finance, Acquisition work etc., and this work is entrusted to the Arbitrator appointed under Section 35 of the Act. That is why the Arbitrator is usually an expert valuer and also a town planner, and generally happens to be an officer of the Town planning Department of the State. He acts also as financial adviser to L.A. and has to guard the interests of both the L.A. and the land owners.

DUTIES AND POWERS OF ARBITRATOR—

Collection of the data for valuation, demarcation of land reserved for public purpose, allotment of reconstituted plots among the original owners, work out the original value, and the semi-final value, to prepare an estimate of the total cost of scheme and the total increase in the values of the plots due to the scheme, to determine the compensation to be paid and increment contribution to be recovered from each owner, to transfer rights according to re-allotment, assess betterment contribution, etc. Important matters which he is not competent to decide like levy of increment contribution, betterment etc., are to be referred by him to the Tribunal. The Arbitrator gives a final shape to the scheme, and then sends it to Govt., through the L. A. for final sanction.

(c) TRIBUNAL OF ARBITRATION.—Section 39 provides for the constitution of the Tribunal for deciding all important matters of vital interest, to the land owners, such as the market value of their properties, recovery of increment contribution, payment of compensation for factors like injurious affection etc. The Tribunal consists of a President and two assessors, the latter being appointed by the President. The

decision of the Tribunal is final and binding on all the parties.

After the Tribunal has given its decision on several matters referred to it, the Arbitrator draws the the final scheme and sends it on to Govt. for final sanction. After the scheme is sanctioned, a Notification is issued by Govt. giving the date, on which the scheme is to come into force and from that date, all lands required by the local authority will vest absolutely in the local Authority free from all encumbrances and the local Authority can then proceed in the execution of the works contemplated in the scheme.

CHAPTER XV

Valuation of Immovable Properties

The financial side of Town-planning and Improvement schemes, which essentially includes the cost of acquisition, is an integral part of such schemes. The cost of acquisition is governed by the amount of compensation to be paid for such acquisition, which in turn is based on the market value of the property. So any academic course of town-planning is incomplete without a chapter on valuation. This would be therefore the last part of our studies.

(1) DEFINITIONS.

To begin with, definitions of important terms, which we come across in every day valuation practice, are given below.

(i) *Cost* :—

The *cost* of the building or any commodity is the money spent on its construction or its procurement.

(ii) *Value* :—

Value of a property is what it will fetch, if it is put to sale in an open market. It may be more or less than the actual cost.

(iii) *Gross rental value* :—

It is the *gross* annual income, which a house owner gets from the building, on the assumption that the cost of Municipal taxes, repairs etc., is met by the house owner.

(iv) *Net rental value* :—

The *gross* rental value minus the outgoings by way of Municipal taxes, repairs, maintenance etc. is called net rental value.

(v) *Outgoings*—The *outgoings* are the amount of total annual expenditure incurred by the owner of the building, on account of Municipal taxes, Insurance, Repairs and Maintenance etc. This amount is to be deducted from the gross annual return, to get the net annual return.

(vi) *Use value* :—

Use value is the value of any land according to the actual use to which the land has been put at any time even though it is capable of fetching more, if it is put to more profitable use.

(vii) *Potential Value* :—

It is the value of land according to the most lucrative or most profitable use, it is capable of, at any time.

Under the L. A. Act, the compensation is paid on the basis of *potential* value while under the Town-planning and the Improvement Trust Act, it is paid on the basis of *actual use* value, for the same land.

(viii) *Market Value* :—

Market value is what a prudent and willing purchaser, will pay to a willing seller, in the open market. Sub-normal prices for which a person is forced to sell a thing on account of monetary difficulties or fancy prices paid under extraordinary circumstances, are not taken as market value.

(ix) *Permanent & Terminable Annuity*

An annuity is the net annual income or return from any investment and would continue only for the life-time of the property, on which the investment is made. Where the life of the property is permanent, it is called "Perpetual Annuity". In the other case, it is called "Terminable Annuity".

(x) *Reversional value of land*:—

The land on which a structure is built has no separate value, so long as the land, is married to the building, but when the life of the

building is over, the land reverts to its open land value called *reversional value*. The present worth of this land value, (P. V.) at a suitable rate of interest is added to the capitalised cost of the building, to arrive at the market value of the whole property including both land and building.

(xi) *Year Purchase:-*

The market value of an annuity, is obtained directly by multiplying the amount of Net Annual return by a multiplier which has to be worked out, for the given set of conditions. In the case of permanent annuities, the year purchase is equal to 100 divided by the rate of interest. In the case of terminable annuities, it has to be worked out for the given rates of interest and life of the property. This multiple is called "Year Purchase" or "Y. P." in its short form. The amount of net annual return when multiplied by the Y. P. gives the market value directly. The Y. P. figures for any given conditions can be easily found out from any printed valuation tables (Miram's Table).

(2) METHODS OF VALUATION OF OPEN AND BUILT UP LANDS.

The most common cases that arise for valuation are (1) Open lands, (2) Built up lands.

The methods employed for their valuation are referred to in brief below:—

OPEN AGRICULTURAL LAND.

There are two recognized methods for valuation of open land viz., (1) Valuation is based on recent sales of land of similar types or similar advantages and disadvantages. From a number of sales of similar lands, a rate per acre is derived and the market value is directly obtained by multiplying the acreage by this rate.

(2) Capitalisation of the net annual returns or profits from the land, treating it as a permanent annuity and then deduction of an amount called "Capital Expenditure" necessary to maintain the land in good condition. It should be seen that the value obtained by both methods tally with each other. The rate of interest taken for capitalisation varies with the type of land. For Agricultural land, it will be 7 to 8%.

BUILT UP LANDS.

The cases fall into two categories according to the life of the building viz., (a) Permanent Buildings and (b) Building with limited life.

(a) Permanent Buildings.

Permanent buildings are treated as perpetual annuities and so the method suggested above for open lands, applies in this case also. It may be put in the form of an equation;—

Market value of Permanent Buildings = (Annual Net Return X Y. P.)—Capital expenditure if any, for keeping the Building in rentable condition.

(b) Buildings with limited life.

The Principle behind valuing such buildings, which are terminable annuities, is that the purchaser must redeem his capital, during the life of the building, setting aside a sum known as "Sinking Fund", which he does out of his income from the building. At the same time, he must get his interest on the capital invested. So in the valuation of the building of this category, a number of factors enter into consideration viz., (i) Life of the building, (ii) Interest on investment, (iii) Annual Sinking Fund to recoup the capital invested, at the end of the life of the building, at a safe rate of interest, (iv) Reversion to land value.

The equation will be:-

Market value of building of limited life = (Annual Net Return \times Y. P.) + deferred value of the land — Capital Expenditure for immediate repairs if any.

Illustrative Example of the Valuation of Built up Property

Area—2486 sq ft.

Property:—Municipal House no. 13141

Date of notification:—27th August 1941

Estimated Future Life—10 Years.

1) Gross Annual Rent:— Rs. 16/- x 12= Rs. 192- 0-0

Less outgoings:—

(a) Municipal Taxes:—

Water:—	}	Rs. 36- 0-0
Conservancy:—			
Houses tax:—			

(b) Vacancies, Bad debts

Cost of collection at 6%—
of gross rent.

Rs. 11- 8-0

(c) Repairs at 10% of
gross rent.

Rs. 19- 3-0

Total Rs. 66-11-0
or say Rs. 67- 0-0

Net annual incomeRs. 125- 0-0

Capitalizing for 10 years at $3\frac{1}{2}\%$ allowing
redemption of capital at 3% Y. P. 8.18

Capitalized value of Net Rent=Rs. 125 x 8.18 Rs. 1023- 0-0

Deduct for immediate repairs
necessary to ensure the rent
for estimated future life

Rs- 20- 0-0

Net Capital Value— Rs. 1003- 0-0

(232)

Reversion to land value:—

Area 2486 sqft. @=Rs. 0-4-0 per sqft=Rs. 622- 0-0

Add deferred Value for 10 years

at 3%=Rs. 622 x 0'74=Rs. 460- 0-0

(P. V. 0. 74)

Total Market Value of Property=Rs. 1463- 0-0

Add. 15% Statutory allowance

for Compulsary acquisition=Rs. 220- 0-0

Total Amount of Compensation—Rs. 1683- 0-0

Note:-A compensatory amount is to be further added for damages or loss sustained on various accounts such as injurious affection, severance, diminution of Profits, in the interim period etc.



A few extracts from Reviews on the
Hand Book of Town Planning

(1st Edition)

I I have gone through your 'Hand Book of
I Town Planning and I am glad to note that it
(contains very good information likely to prove
quite useful to the Technical Staff of the Local
Bodies and even to Lay-men.

Nagpur,
21-4-1955,

Sd, *D. G. Karanjgaonkar*,
F. R. I. B. A., F. I, I. A. F. I, T P.
(Govt. Architect & Town
Planning Expert, M. P. Govt.)

Inst
2688

We have great pleasure in welcoming the publication of Mr. Bhedasgaonkar's Hand Book of Town Planning. Mr. Oak's book with identical title was published about a couple of years back. Mr. Bhedasgaonkar has kept in view the requirements of non-technical students of Town Planning who appear at the Local Self-Govt Diploma and other classes in different States. He has dealt with the subject in a concise and brief manner without going into the labyrinth of minute provisions of law or technicalities of a Town Planner. The book is well fitted for imbibing elementary principles of the subject. We recommend the book to student world in India.

Editor,
Journal of Local Self Govt. Institut
Bombay (Jan. 1954. issue)

2904

79-80

CONCEPTION OF MODEL TOWN

A pleasant kindly town, with every possible adjunct of convenience, safety and beauty, not so large as to be incomprehensible, and not so small as to be unable to give all that its citizens ask of work, play, education etc. and a fine specimen of Human Creative Art.

"But unless it is realised that mere administration of Acts of Parliament will never and beauty to convenience and unless we make it difficult for the design of our buildings to fall in to the hands of untutored and unqualified men, we shall not achieve the desired perfection."

"Let us have dignity and scholarship in civic lay-outs and buildings, gaiety, interest, and spaciousness in our streets, fine planning and good construction in our housing areas, and everywhere a recognition of the importance of the cultivation of the art of life for every citizen."

Let us remember that urbanization is in itself not a bad thing. It has been said that "God made the country, man made the town, but the Devil knows who made the Slum."

—W. H. ANSELL,

M. C. F. R. I. B. A.

President, in course of his address at the
Royal Institute of British Architects.